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## The rising costs of nutritious foods in Ethiopia

Fantu Bachewe, Kalle Hirvonen, Bart Minten, and Feiruz Yimer

Diverse nutritionally-rich diets are important in their own right, but particularly so in the combat against chronic undernutrition. This is particularly relevant for Ethiopia where young children consume one of the least diverse diets in sub-Saharan Africa. To better understand the affordability of nutritious foods in Ethiopia, we analyze consumer price patterns of different food groups – often used together to proxy for dietary quality. Using a large-scale price dataset collected monthly in 116 urban retail markets across the country, we find that real prices of all nutritionally-rich food groups increased between 19 and 62 percent over the last ten years. This contrasts with staple crops (grains, roots, and tubers), which did not show any price increase, and with oils, fats, and sugar, the prices of which decreased substantially. Similar price trends are seen in rural areas. Given the large influence of prices on consumer choices in countries like Ethiopia, more investments and attention to the production of nutritious foods – combined with behavioral change messaging – is needed to reduce the prices of such foods to improve their affordability for consumers.

### INTRODUCTION

Given the high prevalence of undernutrition among children in low income countries and the associated high human and economic costs (Hoddinott et al. 2013), improving nutritional outcomes must be an urgent priority. Improving nutrition is high on the policy agenda of the government of Ethiopia, as stated in the Growth and Transformation Plan II, which aims to reduce young child stunting levels from 40 percent in 2014/15 to 26 percent in 2019/2020.

Lack of access to diverse diets is one of the underlying factors contributing to chronic undernutrition (Arimond and Ruel 2004, UNICEF 1998). Despite recent improvements, child stunting in Ethiopia remains widespread (CSA and ICF International 2017). Moreover, Ethiopian children consume one of the least diverse diets in sub-Saharan Africa (Hirvonen 2016). At the household level, food consumption baskets are dominated by cereals and pulses, while the consumption of animal-source foods and fruits and Vitamin A-rich vegetables is rare, especially in rural areas.<sup>1</sup> Such monotonous diets are regarded as a major contributor to non-communicable diseases in Ethiopia (Melaku et al. 2016).

Recent research suggests that the poor dietary diversity in rural areas can be explained, at least partly, both by limited knowledge about the health benefits of diverse diets and by poor access to food markets. Households in areas in which food crop production is not very diverse but which have good access to markets are found to have more diverse diets than do households in such areas but which have poor access to markets and, so, depend primarily on own-production for the food they consume.<sup>2</sup>

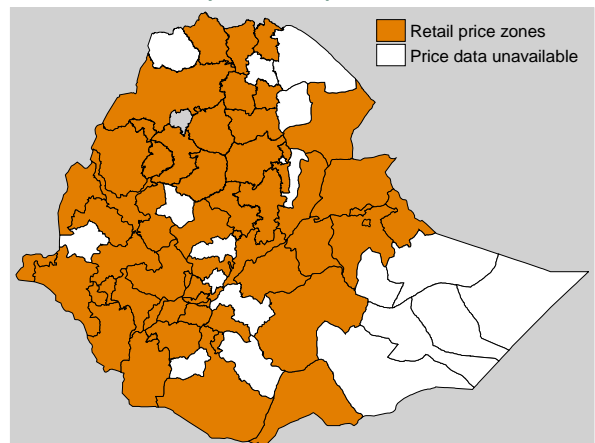
Yet, even with sufficient access to markets and knowledge on the benefits of diverse diets, poor households may simply be unable to afford nutritionally rich foods (Warren and Frongillo 2017). Indeed, prices and affordability of nutritious foods remains a neglected area of research in efforts to understand poor dietary diversity in Ethiopia and elsewhere.<sup>3</sup> In the analysis described here, we explore how prices and, consequently, the affordability of nutritious food have changed over the last decade in Ethiopia.

### DATA AND METHODOLOGY

For urban and peri-urban areas we use monthly price data for the period between January 2007 and December 2016 collected by the Central Statistical Agency (CSA) of Ethiopia under its periodic Consumer Price Survey. This survey series has been conducted since 1996. Prices currently are collected from 116 markets in all regions (but not in all zones) of Ethiopia. The number of surveyed markets in each region is approximately proportional to the region's share of the total urban population to ensure a sufficient degree of national representativeness (Figure 1).

CSA enumerators—who reside permanently near these markets—collect price and weight/volume data from traders, retailers, and consumers. To assure comparability of prices over time and to remove the effect of general inflation on prices, we compute real prices by deflating nominal prices observed in the markets using the regional General Consumer Price Index (CPI), calculated by CSA, in order to express all prices in December 2011 birr terms (CSA 2017). This means that the prices reported here are relative to the price of the average consumption basket in the country

Figure 1: Zones covered by CSA retail price data



Source: Authors' mapping based on CSA data.

<sup>1</sup> See for example, Ruel, Minot, and Smith 2005; Worku et al. 2016; Hirvonen, Taffesse, and Worku 2016.

<sup>2</sup> See Hoddinott, Headey, and Dereje 2015; Abebe, Haki, and Baye 2016; Kim et al. 2016; Zerfu, Umata, and Baye 2016; Hirvonen and Hoddinott 2017; Hirvonen et al. 2017; Stifel and Minten 2017; Abay and Hirvonen 2017.

<sup>3</sup> For exceptions, see Brinkman et al. 2011 and Iannotti et al. 2012.

**Table 1: Descriptive statistics**

Food group	Items in HCES consumption data, number	Items with retail price data, number	Share of total weight of items with price data, %
Grains, roots, and tubers	70	34	76.0
Legumes and nuts	52	28	83.8
Vitamin A-rich dark green leafy vegetables	4	3	97.6
Other Vitamin A-rich vegetables and fruits	9	6	86.5
Other fruits & vegetables	33	15	89.7
Dairy products	9	5	72.6
Eggs	2	1	94.7
Flesh foods and small animal protein	15	7	97.0
Oils and fats	11	5	86.5
Sugar and honey	6	2	58.3
All food groups	211	106	82.9

Source: Authors' analysis of Consumer Price Survey and HCES data.

Note: Column 4 shows the share by weight of total foods in each food group reported consumed in the HCES for which prices are available in the Consumer Price Survey dataset.

Dietary quality is often proxied by dietary diversity. The literature typically adopts different numbers of food groups to measure dietary diversity for different demographic groups.<sup>4</sup> The common feature of these approaches is to group food items according to categories of key nutrients they provide. Following this approach, we study the price evolution of ten different food groups: Grains, roots and tubers; Legumes and nuts; Dairy products (milk, yogurt, cheese); Eggs; Flesh foods and small animal protein; Vitamin A-rich dark green leafy vegetables; Other Vitamin A-rich vegetables and fruits; Other fruits and vegetables; Oils and fats; and Sugar and honey (Table 1). Households or individuals regularly consuming foods from a greater number of these food groups are likely to meet their needs in terms of macro- (e.g., carbohydrates, protein) and micro-nutrients (e.g. vitamin A, iron, zinc).

We use the 2011 Household and Consumption Expenditures Survey (HCES) data to identify the items in each food group and to compute the average share of each item in the total weight (100%) of per capita consumption of each food group [at the administrative zone level].<sup>5</sup> Table 1 lists the number of items in each food group in the HCES data (column 2) and those with price information in the CSA dataset (column 3).

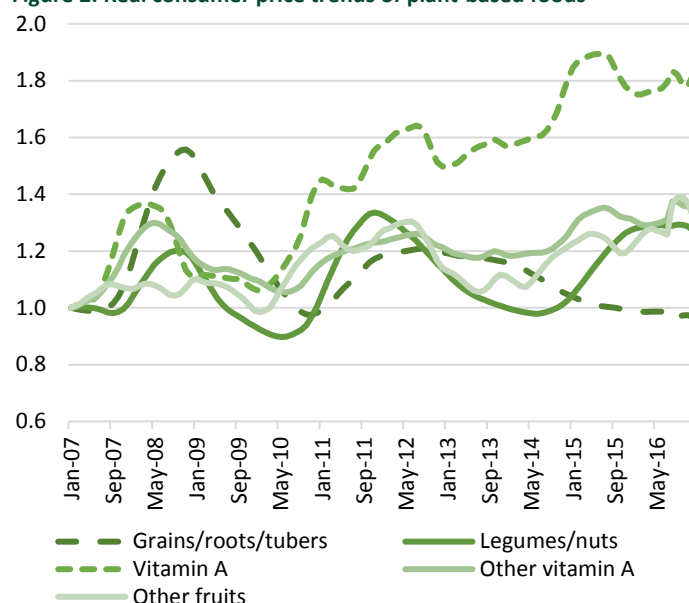
Then, for each of the ten food groups we calculate a weighted average price.<sup>6</sup> That is, the average price considers the consumption share (importance) of each item in each food group. Out of the 211 items in all food groups (column 2, last row), price information is available for only about half (106) of the items (column 3). Nevertheless, the price data includes the most commonly consumed items that account for a larger share of the total weight in each food group (column 4). For instance, although price data are available for only indigenous hens' eggs, the other item, hybrid hens' eggs, accounted for less than 6 percent of the consumption in the Eggs food group. Table 1 shows that, overall, we can account for the price evolution of 83 percent of the average consumption basket (column 4, last row).

While we expect rural and urban prices to be highly correlated within zones, we conduct the same analysis using producer prices from rural markets. Although the producer price data have even

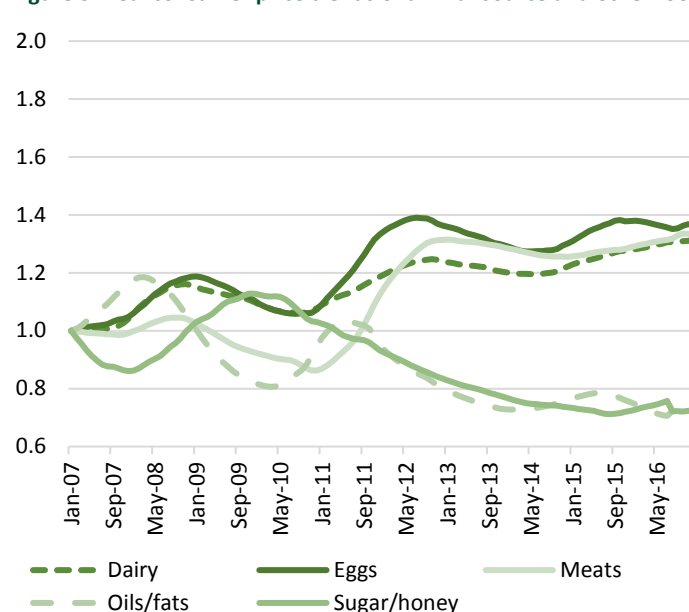
wider coverage of nearly 2,100 rural markets, they include only primary (crop and livestock) outputs produced in each locality and exclude all processed or semi-processed items. As a result, they are not representative of prices of all items consumed by rural households. To compensate for the lack of producer price data for a large number of processed items, we use zonal average retail prices of the items.

## FINDINGS

Figures 2 and 3 depict how the real consumer prices of different food groups have changed over the last decade in Ethiopia. Figure 2 shows the price trends of plant based food and Figure 3 the price trends of other food groups (animal-source foods, oils/fats, and sugar/honey). All price indices are set to 1.0 in January 2007, the first month in the price data used here. Price index values above 1.0 mean that real prices for foods in that food group increased in aggregated, while values below 1.0 imply that foods in the food group have become cheaper over time in real terms.

**Figure 2: Real consumer price trends of plant-based foods**

Source: Authors' analysis of Consumer Price Survey and HCES data.

**Figure 3: Real consumer price trends of animal-source and other foods**

Source: Authors' analysis of Consumer Price Survey and HCES data.

<sup>4</sup> For example, WHO (2008) recommends a 7-food group indicator for children 6-24 months of age. FAO and USAID's Food and Nutrition Technical Assistance III Project (FANTA) proposes a 10-food group indicator to assess women's dietary diversity (FAO and FHI360, 2016) and a 12-food group indicator for household level analysis (Swindale and Bilinsky, 2006).

<sup>5</sup> HCES is the official source of poverty statistics in Ethiopia.

<sup>6</sup> For more information of the construction of prices indices, see Deaton and Tarozzi (2000).

Figure 2 and 3 show that the aggregate prices of seven out of the ten food groups have increased over the last decade. The largest price increases are observed for the Vitamin A-rich dark green leafy vegetables group – real prices increased by 80 percent between January 2007 and December 2016 for this food group (Figure 2). Prices of the other fruit and vegetables groups increased by about 40 percent over this period. The price index for legumes and nuts displayed considerable volatility over the last decade – in December 2016, real price of legumes and nuts were about 30 percent higher than in January 2007.

From Figure 3, we see that the prices of all animal-source food categories also increased substantially. The real prices of dairy, eggs, and meat increased by about 30 percent over the last decade. This increase is in contrast with grains, roots, and tubers prices, which at the end of 2016 were at the same level as in the beginning of 2007 (while prices were high in 2008 and 2009, possibly linked to the international food price crisis). Although grains, roots, and tubers are important in the total consumption basket and as a share of overall expenditures, generally their prices did not increase. However, the increase in prices of the remaining food categories is worrisome since the consumption of these food groups – many of which are rich in macro- and micro-nutrients that are not densely available in staple crops – is low in many parts of Ethiopia.

We also examined changes in prices of food categories traditionally associated with rising obesity (Popkin, Adair, and Ng 2012), namely sugar and oils and fats. While obesity is less of an issue in Ethiopia than in other countries, it is an emerging problem with 6 percent of adult women nationally and 15 percent in urban areas being overweight or obese according to the latest available data (CSA and ICF International 2012). Related, an increasing number of Ethiopians are struggling with high blood pressure and diabetes (FMoH/UNICEF/ EU 2016). We find that prices of sugar and honey decreased by 24 percent over the last decade, while oils and fats decreased by 35 percent, a worrying trend.<sup>7</sup>

**Table 2. Evolution of retail and producer prices, by food group, percentage total change in real prices between 2007 and 2016**

Food group	Urban retail prices	Rural producer prices
Grains, roots, and tubers	-2.3	-2.4
Legumes and nuts	26.2	24.5
Vitamin A-rich dark green leafy vegetables	61.9	11.4
Other Vitamin A-rich vegetables and fruits	18.8	3.0
Other fruits and vegetables	22.0	-0.3
Dairy products	26.9	39.2
Eggs	34.1	41.0
Flesh foods and small animal protein	33.4	15.4
Oils and fats	-35.2	-36.3
Sugar and honey	-23.6	-19.1

Finally, we provide the results from the rural producer price data, augmented with retail prices, in the last column of Table 2. These results are qualitatively similar with those obtained from the retail price data with two exceptions. First, increase in prices of animal-source foods items, except for meats, are higher. Second, prices of ‘other fruits’ remained about the same. Overall, in-

creases in prices of most crop items are relatively smaller. Nevertheless, an increase in real prices of vegetables, fruits, legumes, and nuts in these areas where most households are engaged in cereal production indicates that production and productivity lagged behind the growth in demand for these food items.

## CONCLUSIONS AND IMPLICATIONS

We study price patterns of the different food groups required to improve diet quality in Ethiopia. We find that prices of all food groups rich in macro- and micro-nutrients increased in real terms. At the same time, real prices of food groups that are associated with overweight and obesity (oils, fats, and sugar) decreased over the last decade. Similar patterns emerge when we use producer price data from rural areas instead of consumer prices.

These price evolutions are important for nutrition as prices of food are critically important in consumption decisions of low-income households as shown by the consistent empirical estimates of high food price elasticities. For example, Tafere et al. (2010) used variation in prices in Ethiopia to study to what extent consumption patterns change with changing prices, based on the national consumption survey of 2005. They estimated that price elasticities of most food items were close to -1.0 suggesting that a 10 percent increase in prices is associated with a 10 percent decrease in consumption.

Our findings have important policy implications. The Ethiopian government has a good track record with respect to improvement of cereal production in the country in the last decade. This improvement has been driven by a focus on modernizing the agricultural sector and increased adoption of modern technologies (Bachewe et al. 2015). It has been shown that increased productivity and production in the cereal sector has brought about considerable improvements in poverty alleviation and calorie intakes (World Bank 2014). However, in the further transformation process, ‘high-value’ crops, such as fruits and vegetables and animal-source foods, which are consumed more frequently as income increases, i.e., they are income elastic, are critical to improving the quality of diets, but current price trends would limit their accessibility to the poor.<sup>8</sup>

To reduce price levels, improve dietary quality, and ultimately impact nutritional and health outcomes in the country, more investments and attention to the ‘high-value’ agricultural and livestock sector production systems therefore are needed. This is important as efforts to achieve improvements in nutritional outcomes in Ethiopia have focused on improving nutrition knowledge (dietary culture) through behavioral change communication. While important and successful (e.g., Kim et al. 2016), improving access to and achieving low prices for these nutritious foods have also an important role to play as a part of multidimensional efforts to improve nutritional outcomes.

<sup>7</sup> The price decreases for these latter products might be related with price settings and market control by the government. Sugar production and imports in the country is monopolized by the Sugar Corporation Enterprise. Palmoil, the most common commercial brand of cooking oil in the country, is imported by the government and often distributed through its kebele shops at subsidized prices (Assefa et al., 2016).

<sup>8</sup> As noted in other growing economies, the relative importance of cereals in total food expenditures is already decreasing in Ethiopia and we begin to see a shift toward more preferred, but also more expensive foods, including ASF (Worku et al. 2015).

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### INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

2033 K Street, NW | Washington, DC 20006-1002 USA

T: +1.202.862.5600 | F: +1.202.457.4439

Skype: ifprihomeoffice | [ifpri@cgiar.org](mailto:ifpri@cgiar.org) | [www.ifpri.org](http://www.ifpri.org)

### IFPRI-ESSP ADDIS ABABA

P.O. Box 5689, Addis Ababa, Ethiopia

T: +251.11.617.2000 | F: +251.11.646.2318

[mahlet.mekuria@cgiar.org](mailto:mahlet.mekuria@cgiar.org) | <http://essp.ifpri.info>



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