

AFFORDABILITY OF NUTRITIOUS FOODS FOR COMPLEMENTARY FEEDING IN **ETHIOPIA**

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For more details and full sources, see the following article from which this brief is drawn:

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KEY MESSAGES

- Several foods commonly available in Ethiopia are rich in nutrients lacking in young children's diets. However, resource-constrained households (the lowest-spending 15–20%) struggle to afford enough of these nutritious foods to meet even 50% of the dietary requirements for protein (from animal sources), calcium, and iron for their children under age two.
- Zinc presents the greatest affordability barrier—beef liver is by far the lowest-cost option but is likely unaffordable to half of households in the quantity required to meet half of nutrient needs.
- While a dietary gap in vitamin A persists, it is not due primarily to unaffordability: all households can afford enough foods (dark green leafy vegetables, beef liver, carrots, pumpkin, and chicken liver) to meet 50% or more of needs.
- The most affordable foods to fill the remaining nutrient gaps are dark green leafy vegetables (iron and calcium) and cottage cheese (protein). Other options include milk (protein and calcium) and pulses (iron and zinc), but at current prices these foods are unaffordable in the quantities required to meet half of nutrient needs for most households in Ethiopia.
- Several of these foods are commonly consumed and produced by Ethiopian households. In the short term, addressing child undernutrition among resource-constrained households may require providing cash or in-kind transfers or, for some nutrients, commercial fortification, point-of-use fortification, or supplementation. In the medium to long term, it will be crucial to promote home production of nutritious foods, lower the prices of these foods, and/or raise households' incomes.

WHY DOES AFFORDABILITY OF COMPLEMENTARY FOODS MATTER IN ETHIOPIA?

Ethiopia is the second most populous country in Africa, with a population of 105 million people,¹ 30% of whom live below the national poverty line.² Despite having one of the highest rates of per capita GDP growth in the world over the past 10 years, Ethiopia remains a low-income country.^{3,4} The agriculture sector is dominated by small-holder farmers, who are responsible for 95% of agricultural production, but most farmers produce only about half of their food intake requirements.⁵ Since the 1990s life expectancy at birth has increased by almost 20 years, and mortality rates for children under five and infants have decreased by 30–40%.⁴ Despite these gains, child undernutrition is a persistent problem: 38% of children under five are stunted, and 86% of children aged 6–23 months do not consume an adequately diverse diet.⁶

Many children in the complementary feeding period—the period when infants and young children are 6–23 months old and breast milk alone is no longer sufficient to meet their needs—do not consume enough iron, vitamin A, calcium, zinc, and animal-source protein, and these shortfalls hinder their growth and development.^{7,8} Unaffordability is an important barrier, among others, to the consumption of foods rich in these important nutrients. However, the extent to which unaffordability is a barrier for specific nutrients and which foods are the most affordable sources of these nutrients are unclear. This brief summarizes

the affordability of nutritious foods that could fill important nutrient gaps during the complementary feeding period and discusses implications for programmes and policy.

METHODS

Using price and household expenditure data from the 2015–16 Ethiopia Household Consumption and Expenditure Survey,⁹ we benchmarked the cost of foods that could meet nutrient requirements against current household food expenditures to assess affordability, using a previously developed method.¹⁰ Because nutrients are generally obtained from a combination of foods, we analysed whether households could afford to meet half of the daily requirements for protein, iron, vitamin A, calcium, and zinc for their children under age two through specific foods. These foods were chosen because of their nutrient content and availability in Ethiopia. For protein, only animal-source foods were used since plant-based sources of protein are generally not complete in essential amino acids critical for child growth and development.¹¹ We calculated the cost of realistic portion sizes required to meet 50% of nutrient needs from complementary foods (since nutrient requirements are met through a combination of foods), adjusting for refuse, cooking yield, and bioavailability where applicable.¹⁰ To assess the relative affordability of nutrients and foods, these costs were compared with current food spending per adult equivalent (a method of adjusting for household size and composition) for each household with children under age two surveyed. To

assess absolute affordability, we established a threshold of 10% of household food spending per adult equivalent, based on previous analysis.¹⁰ We also assessed foods in terms of their affordability for meeting needs for several micronutrients in combination. In this joint micronutrient analysis of six key micronutrients commonly lacking in the diets of infants and young children, we calculated which foods are most affordable at providing an average of one-third of a young child's daily nutrient requirements from complementary foods. Finally, we compared the relative costs of energy among those foods that provide at least 100 kilocalories of energy in a 100 g portion (a threshold of 50 g was used for milk). It is important to note that this research contains several limitations, which are described in Ryckman et al. (2021).¹⁰

HOUSEHOLD FOOD EXPENDITURE AND CONSUMPTION PATTERNS

On average, households spent 58% of their total expenditures on food. Purchases made up 63% of food expenditures (i.e., total value of food consumed from all sources) while 37% came from own production and other sources. Households allocated one-third of food expenditures to cereal products. All other food categories each made up less than 10% of total expenditures, although vegetables and pulses were also commonly consumed by 90% and 80% of households, respectively. Consumption of animal-source foods was less common, with 41% of households consuming dairy products in the prior week but fewer than one in four households consuming meat, fish, or eggs.

Only three of the nutritious foods chosen for this analysis as possibilities to fill one or more nutrient gaps were consumed by more than 25% of households: pulses (84% of households), dark green leafy vegetables (40%), and fresh milk (30%) (Figure 1). These were also the only three foods consumed from home production by more than 10% of households (15–25%). All foods were consumed far less commonly than cereal products.

AFFORDABILITY BY NUTRIENT

Animal-source protein: Cottage cheese is the most affordable animal-source protein, at a cost that averages 8% of adjusted household food expenditure for a portion size meeting half of protein needs from complementary feeding (Figure 2). Cottage cheese is the only food that falls below the 10% threshold on average, but it would still be considered unaffordable at this threshold to 26% of households (Figure 3). The next lowest cost animal sources of protein are fresh milk and eggs (both 13% of adjusted food expenditure for the average household) and beef (15%), but these foods exceed the 10% threshold for 40–54% of Ethiopian households with children under two.

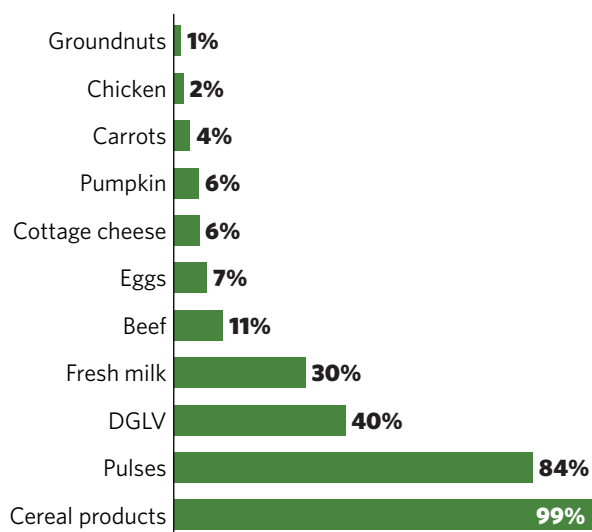


FIGURE 1. Percentage of surveyed households that had consumed selected foods in the past week. Data are from 5,808 households in the 2015–16 Household Consumption and Expenditure Survey.⁹ DGLV = dark green leafy vegetables.

Calcium: Only two foods that are commonly consumed by households in Ethiopia were identified that could feasibly supply half of children's calcium needs from complementary feeding: dark green leafy vegetables and fresh milk. Of these two foods, only dark green leafy vegetables cost less than 10% of adjusted food expenditure for the average household (they fall below this threshold for 87% of households). Milk averages 18% of adjusted food expenditure and is unaffordable for 62% of households at a 10% threshold.

Iron: Dark green leafy vegetables are a substantially lower-cost source of iron than alternatives and are the only food that falls below the 10% affordability threshold for the average household. At this threshold, dark green leafy vegetables would be an affordable source of iron for 89% of households. Pulses and beef liver are the next lowest cost options but are unaffordable to 72% and 80% of households, respectively.

Vitamin A: Vitamin A is the most affordable nutrient analysed. Several foods could meet half of vitamin A requirements from complementary feeding for 2% of adjusted food expenditure (on average) or less. These foods include beef liver (<1%), carrots (<1%), pumpkin (1%), dark green leafy vegetables (1%), and chicken liver (2%). These foods cost less than 10% of adjusted food expenditure for 100% of households. Fresh milk and eggs could also be affordable options for 65–79% of households, whereas cottage cheese is the least affordable source of vitamin A.

Zinc: Zinc is the least affordable nutrient included in the analysis, with no foods available that could supply half of

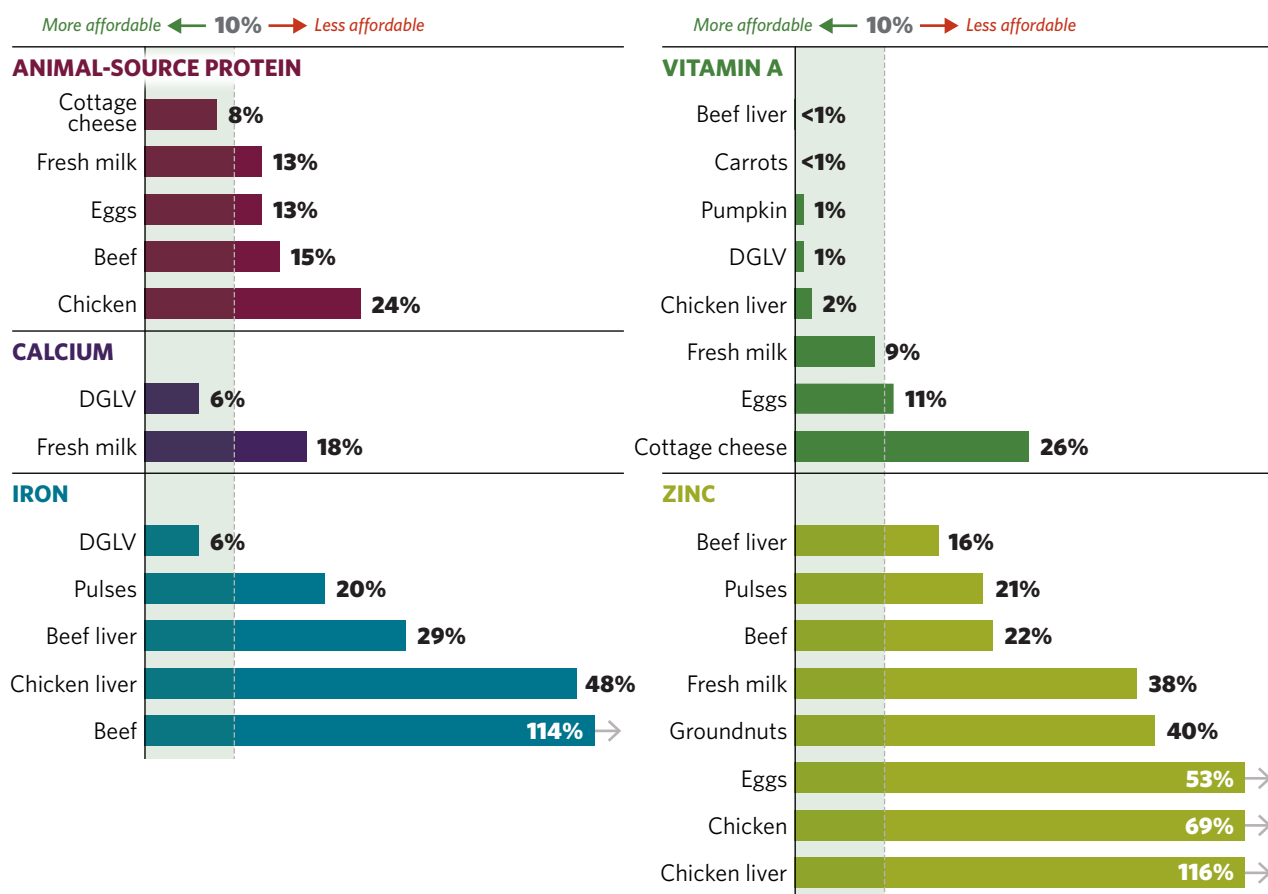


FIGURE 2. Share of food expenditures per adult equivalent needed to meet half of nutrient requirements from complementary foods. The dashed line represents the affordability threshold of 10% of food expenditures. Bars below the dashed line are considered affordable. Household expenditure data are from 5,808 households in the 2015–16 Household Consumption and Expenditure Survey.⁹ Nutrient densities are mostly from the United States Department of Agriculture food composition database as well as regional food composition tables and published literature.^{12–18} Nutrient requirements from complementary foods are from Ryckman et al. (2021).¹⁰ DGLV = dark green leafy vegetables.

zinc requirements from complementary feeding while costing the average household less than 10% of adjusted food expenditure. Beef liver comes the closest, averaging 16% of adjusted food expenditure but is unaffordable for over half of households at a 10% threshold. Pulses and beef are the next lowest cost options to meet zinc needs, but they are unaffordable for approximately three-quarters of households.

AFFORDABILITY ACROSS MULTIPLE MICRONUTRIENTS

When food affordability is assessed based on foods' contributions to the requirements of six micronutrients that are commonly lacking in young children's diets in Eastern and Southern Africa, the most affordable foods are beef liver, dark green leafy vegetables, and chicken liver (Figure 4). These foods are also among the most affordable sources of several single micronutrients: iron (dark green leafy vegetables), vitamin A (all three foods), calcium (dark green leafy vegetables), and zinc (beef liver is the lowest-cost source of zinc but is considered unaffordable for many

households). Milk and eggs are also considered affordable sources of the six micronutrients in combination and were among the lowest-cost sources of protein. Chicken is by far the least affordable option, but beef and groundnuts are also considered unaffordable. This analysis also illustrates the high nutrient densities of animal-source foods: six animal-source foods could achieve an average of one-third of micronutrient requirements for portion sizes of 100 g or less, but only two plant-source foods could do so.

DIETARY ENERGY AFFORDABILITY

Although animal-source foods tend to be relatively nutrient rich, they are much less affordable than plant-source foods when considered on the basis of cost per kilocalorie (Figure 5). The lowest-cost animal-source food, fresh milk, costs almost twice as much as the two plant-source foods with the highest energy density (other foods, such as pumpkin and dark green leafy vegetables, did not have high enough energy densities to be considered in this analysis) and costs 15 times as much as maize flour, a commonly consumed

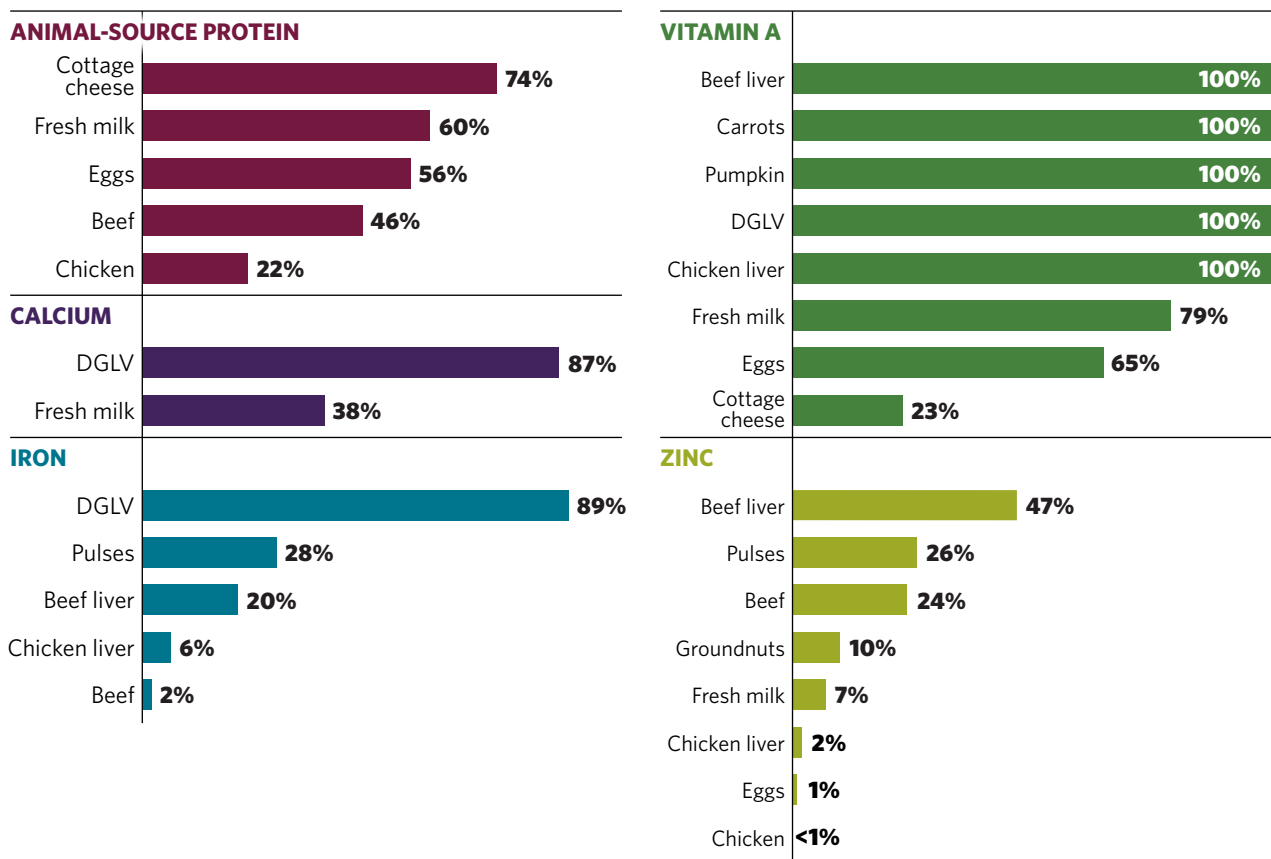


FIGURE 3. Percentage of households able to afford portion sizes meeting half of nutrient requirements from complementary foods. Foods were considered affordable if their required share of food expenditures per person was below the affordability threshold of 10%. Household expenditure data are from 5,808 households in the 2015–16 Household Consumption and Expenditure Survey.⁹ Nutrient densities are mostly from the United States Department of Agriculture food composition database as well as regional food composition tables and published literature.^{12–18} Nutrient requirements from complementary foods are from Ryckman et al. (2021).¹⁰ DGLV = dark green leafy vegetables.

and low-cost but nutrient-poor staple. Even the nutritious plant-source foods, pulses and groundnuts, cost 7–8 times more than maize flour per kilocalorie.

CONCLUSIONS

This analysis has shown that nutrient gaps in animal-source protein, calcium, and iron during the complementary feeding period for infants and young children cannot be affordably filled by all households, particularly the lowest-spending 15–20%. These households likely rely on the cheapest available staple foods and struggle to meet energy and nutrient requirements. Zinc presents even greater affordability barriers and is likely a challenging nutrient for half of households.

The most affordable foods to fill these nutrient gaps include dark green leafy vegetables (iron, calcium), beef liver (zinc), and cottage cheese (protein). Milk and pulses are the second lowest cost options to fill several nutrient gaps (for milk, protein and calcium; for pulses, iron and zinc), but at current prices these foods are unaffordable to 40–75% of households.

While a dietary gap in vitamin A persists, it is not due primarily to a lack of affordability: almost all households can afford enough foods rich in vitamin A to meet even more than half of nutrient requirements, and households have several options to choose from (liver, dark green leafy vegetables, orange-fleshed vegetables).

Dark green leafy vegetables, liver, cottage cheese, milk, pulses, and orange-fleshed vegetables could thus be the focus of initiatives aimed at increasing the production, desirability, and consumption of nutritious complementary foods. Many households already produce and consume dark green leafy vegetables, milk, and pulses. Interventions aimed at boosting home production of these foods (and possibly cottage cheese) could potentially address all of the likely nutrient gaps considered in this analysis. For vitamin A, interventions focused on behaviour and acceptability may be needed, as there is evidence of gaps in consumption even when households have several affordable foods to choose from. In particular, more research is needed on the consumption and desirability of liver. Price reductions could help for some households, but for some nutrients—particularly zinc—prices

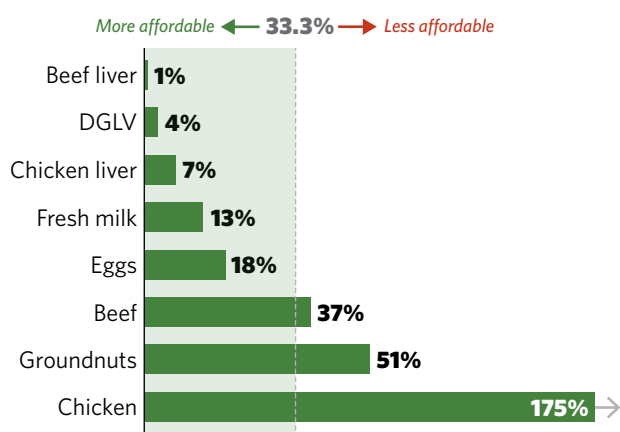


FIGURE 4. Share of food expenditures per person needed to provide an average of one-third of a young child's requirements for iron, vitamin A, zinc, folate, vitamin B₁₂, and calcium. The affordability threshold (dashed line) was set at one-third (33.3%) of food expenditures because this analysis is based on meeting an average of one-third of requirements for six micronutrients from complementary foods. The share of daily requirements of each nutrient provided by the specified quantity of food was capped at 100%. Household expenditure data are from 5,808 households in the 2015-16 Household Consumption and Expenditure Survey.⁹ Nutrient densities are mostly from the United States Department of Agriculture food composition database as well as regional food composition tables and published literature.¹²⁻¹⁸ Nutrient requirements from complementary foods are from Ryckman et al. (2021).¹⁰ DGLV = dark green leafy vegetables.

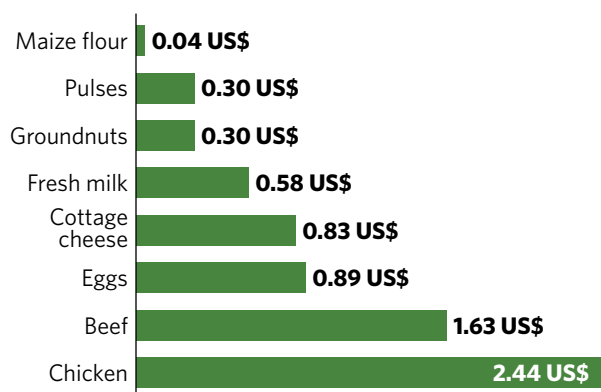


FIGURE 5. Cost of daily dietary energy requirements from complementary foods (450 kilocalories). Price data are from the 2015-16 Household Consumption and Expenditure Survey.⁹ Dietary energy densities are mostly from the United States Department of Agriculture food composition database as well as regional food composition tables and published literature.¹²⁻¹⁸ The cost of 450 kilocalories is shown because this is the average daily dietary energy requirement for a child aged 6-23 months.

would have to decrease substantially to make them accessible to all households. Providing food subsidies to low-resource households or boosting their incomes through, for example, cash transfers could help. For zinc, given its relative unaffordability, alternatives such as fortification or biofortification could be considered.

In conclusion, a combination of interventions will likely be needed to address nutrient gaps among children of complementary feeding age in Ethiopia. Exploring the likely effectiveness and feasibility of these interventions should be a future research priority.

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