

AFFORDABILITY OF NUTRITIOUS COMPLEMENTARY FOODS IN **TANZANIA**

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WHY DOES AFFORDABILITY OF COMPLEMENTARY FOODS MATTER IN TANZANIA?

Tanzania is a low-income country with the sixth largest population in Sub-Saharan Africa (1,2). Poverty is widespread, with 23% of the population falling under the national poverty line (2). Agricultural productivity is among the lowest in Sub-Saharan Africa, and agriculture accounts for less than 25% of GDP despite employing almost 70% of the workforce (2). Most food consumed in the country is produced domestically, and most households rely on markets for purchasing at least some of their food—even rural households purchase close to 38% of energy consumed (4). Agricultural production is dominated by staple crops, predominantly maize (5). Small-scale fisheries represent a vital and widely available food source (6), and 70% of households own livestock (4), yet only 30% of children 6–23 months regularly consume flesh foods (3). Evidence indicates affordability is a serious obstacle to dietary diversity, with 59% of households unable to afford a nutritious diet (7). Child undernutrition is widespread, with 36% of children under two stunted and 74% of children under two not consuming an adequately diverse diet (3).

Many children in the complementary feeding period (ages 6–23 months) in Tanzania do not consume enough iron, vitamin A, calcium, or animal-source protein, which hinders growth and development (8). Inadequate physical and economic access is one of the primary barriers to consumption of foods rich in these important nutrients. However, the extent to which affordability is a barrier for specific nutrients, which foods are the most affordable sources of these nutrients, and which households are able to afford them in adequate quantities for young children is unclear. This brief summarizes the affordability of nutritious complementary foods that could fill important nutrient gaps and discusses implications for programs and policy.

KEY MESSAGES

- Several foods commonly available in Tanzania are rich in nutrients lacking in young children's diets. However, resource-constrained households (the lowest spending 10–15%) struggle to afford enough of these nutritious foods to meet even 50% of their under-two children's dietary requirements for energy, protein from animal sources, iron, and calcium.
- While a dietary gap in vitamin A persists, it is not primarily due to affordability: almost all households can afford enough foods rich in vitamin A (beef liver, carrots, spinach) to meet 100% of needs.
- The most affordable foods to fill nutrient gaps are **groundnuts** (energy), **kidney beans** (energy, iron), **spinach** (iron, calcium, vitamin A), **small dried fish** (protein, calcium, energy, iron), **beef liver** (vitamin A), **carrots** (vitamin A), and **milk** (energy, protein, calcium).
- In the short term, providing **transfers** (cash or in-kind) or, for some nutrients, commercial and point-of-use **fortification**, as well as **supplementation** may be necessary to address child undernutrition among **resource-constrained** households. In the medium-to-long term, efforts to promote **home production** of nutritious foods, **lower prices** of these foods, and **raise incomes** are crucial.

METHODS

Using household expenditure data from the 2014–15 Living Standards Measurement Survey (LSMS) (9), we divided 1,055 households with children under two years¹ into deciles based on their current food expenditure, adjusted for household size and composition. This metric corresponds well with food insecurity indicators, as food insecurity is more common in lower-expenditure deciles and less common in higher deciles.² The analysis assumes lower-spending households are more economically constrained and thus less flexible in how they allocate resources devoted to food. Households in the bottom decile (decile 1) are assumed to be able to reallocate only 1% of total food expenditure towards nutritious foods for young children, households in the second-lowest decile (decile 2) 2%, and so on, with households in the highest decile (decile 10) assumed to be able to reallocate 10% of current spending. As nutrients are generally obtained from a combination of foods, we analyzed whether households could afford to meet half of the daily requirements for energy, protein, iron, vitamin A, and calcium for their under-two children through specific foods. Specific foods were chosen because of their nutrient content and availability in Tanzania. For protein, only animal-source foods were used since plant sources of protein are generally not complete in essential amino acids critical for child growth and development (10). Maize porridge with sugar was included in the analysis of energy to compare its affordability with more nutritious foods. The analysis calculated the cost of realistic portion sizes required to meet the 50% threshold using price data from the LSMS (9). If a household's re-allocable food expenditure exceeded the total weekly cost of a food portion for all children under two years in that household, then that food portion was considered affordable.

HOUSEHOLD EXPENDITURE AND CONSUMPTION PATTERNS

On average, households spent 65% of total expenditures on food. Purchases made up about 65% of food expenditures (i.e., total value of food from all sources) while 35% came from own production and other sources. Average food expenditure in the lowest decile was almost three times lower than in the average household and six times lower than in the highest decile. Households allocated about 32% of resources to cereal products, predominantly maize (Figure 1). Although expenditure on *meat, fish, and eggs* was also high, the quantities purchased of these animal-source foods were smaller due to their relatively higher prices. Vegetables were consumed frequently, but a far lower share of resources was allocated to them. *Roots and tubers*, legumes, and fruits were also consumed regularly by most households.

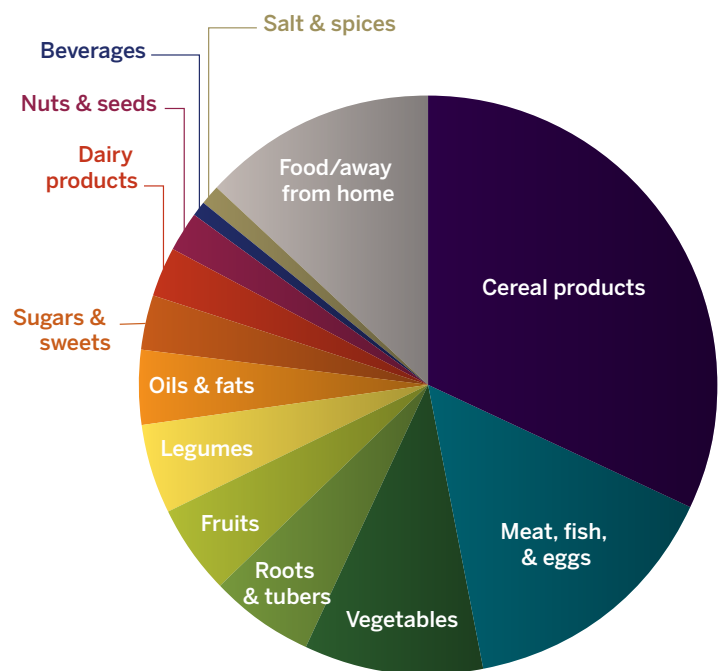


Figure 1. Breakdown of total food expenditures

1 Households with children under two were used because data on children's age in months was not available and thus households with children in the complementary feeding period (6–23 months) could not be identified.

2 Correlations between current food expenditure and food insecurity indicators were tested using data from Tanzania and South Africa.

AFFORDABILITY BY NUTRIENT

Energy

No households in the bottom deciles and few in the second and third are able to meet 50% of their young children's energy needs from the examined nutritious foods at current prices (Table 1). Groundnuts are the most affordable nutritious food to meet energy needs, followed by kidney beans, both of which are affordable to a substantial portion of households in the third decile and higher. Encouraging small-scale household production or price cuts for groundnuts or kidney beans could help households in the lowest two deciles afford these foods. Most households (except in the lowest decile) can afford enough maize porridge to meet energy needs. However, while porridge is a more affordable source of energy, it lacks key nutrients unless fortified or prepared with more nutritious foods like milk or eggs, which reduces affordability.

Animal-source protein

Most households in the bottom decile and some in the second-lowest decile are unable to meet 50% of young children's protein requirements from animal sources. Daga (small dried fish) is the most affordable source of protein and is affordable to most households in deciles 2–10. Fresh fish is also an affordable source of protein for most households in deciles 2–10, milk³ for most households in deciles 3–10 and beef, chicken, and eggs for the majority of deciles 4–10.

Iron

Almost all households in the bottom decile and most in the bottom two deciles are unable to afford 50% of young children's iron requirements through food. Most households in deciles 4–10 can afford to meet 50% of young children's iron needs with beans and spinach, which are the most affordable sources of iron. However, this iron is less easily absorbed by the body than that from animal-source foods. Most households in the top four deciles can afford the necessary quantities of beef liver and chicken liver to meet iron needs, but other animal-source foods are only affordable to households in deciles nine and ten. Even substantial price reductions for beef liver and chicken liver, the most affordable animal sources of iron, may not be enough to address affordability for households in the lowest deciles. Commercial and point-of-use fortification, biofortification, supplementation,⁴ and increased home production are also options for supplying additional iron to diets.

Vitamin A

Vitamin A is the most affordable known nutrient gap for households to fill, with households in all deciles able to afford enough beef liver, carrots, or spinach to meet 100% of vitamin A requirements. Meeting vitamin A needs through chicken liver is also affordable for nearly all households. Milk is also affordable for most households in the second decile and above.

3 It is recommended that children under 12 months of age do not consume milks (flavored or plain) (10).

4 Some potential risks have been associated with supplemental iron in children with adequate iron status. Products with low iron doses may be more appropriate in this context.

Calcium

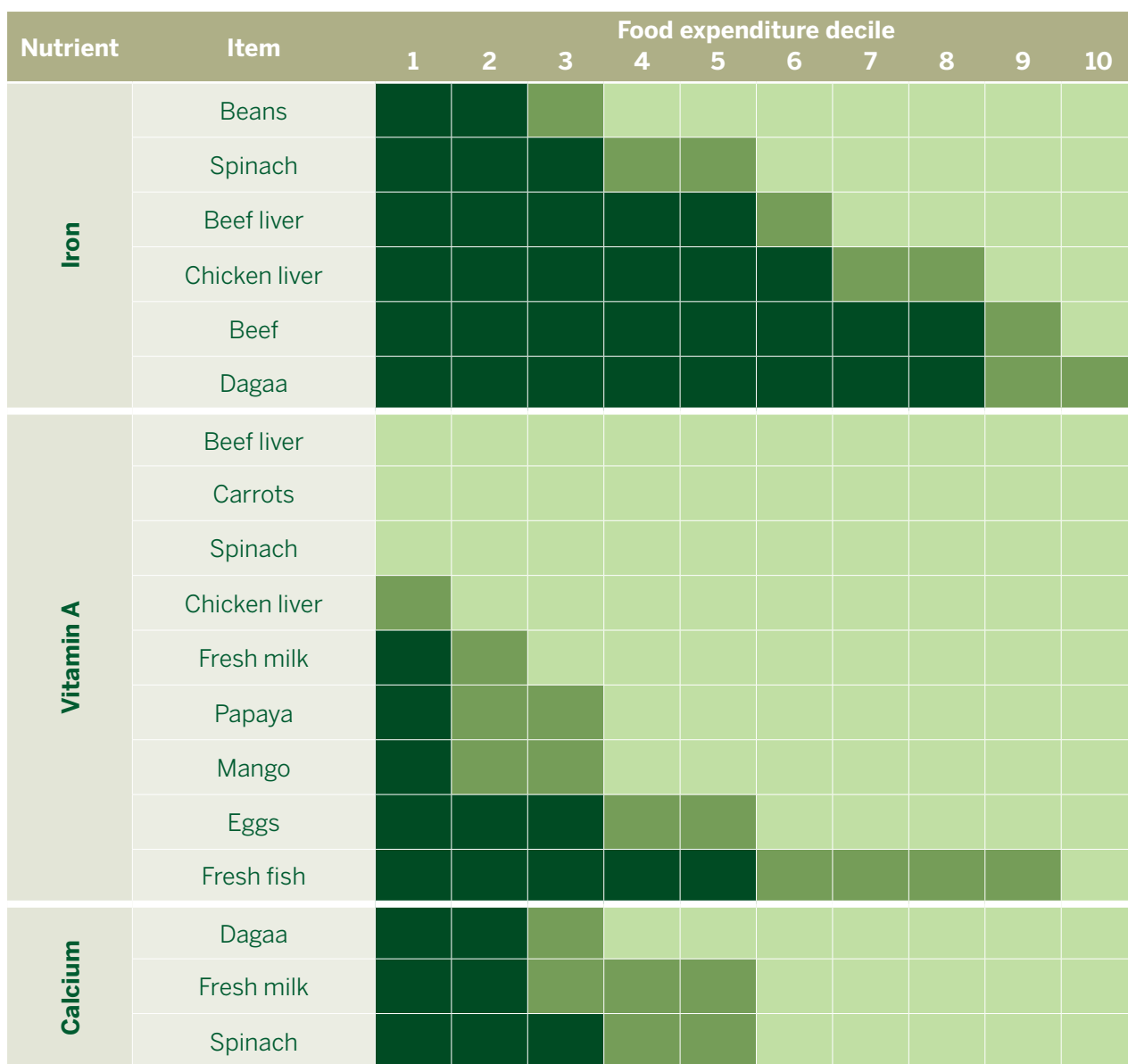
Meeting calcium needs is challenging for most households in the lowest two deciles and many in the third lowest. Dagaa (small dried fish) and milk are affordable to the majority of households in deciles 4–10, and meeting half of calcium requirements through any of the three sources analyzed should be affordable to nearly all households in deciles 6–10. While price reductions can help some households afford enough dagaa to meet calcium needs, many households in the lowest decile will be unable to afford to meet needs even if the price is halved. While spinach is affordable to most households above decile four and can be used to fill calcium as well as vitamin A and iron gaps, the bioavailability of these nutrients is lower than in animal-source foods.

Table 1. Proportion of households per decile able to afford foods meeting 50% of daily requirements of children under two

Nutrient	Item	Food expenditure decile									
		1	2	3	4	5	6	7	8	9	10
Energy	Maize porridge ⁵	Dark Green	Medium Green	Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green
	Groundnuts	Dark Green	Dark Green	Medium Green	Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green
	Beans	Dark Green	Dark Green	Medium Green	Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green
	Fresh milk	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Medium Green	Medium Green	Medium Green	Medium Green	Very Light Green
	Dagaa	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Medium Green	Medium Green	Medium Green	Very Light Green
	Fresh fish	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Medium Green	Medium Green
	Eggs	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Medium Green	Medium Green
	Beef	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Medium Green
	Chicken	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green
Protein	Dagaa	Dark Green	Medium Green	Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	
	Fresh fish	Dark Green	Medium Green	Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	
	Fresh milk	Dark Green	Dark Green	Medium Green	Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	
	Beef	Dark Green	Dark Green	Medium Green	Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	
	Eggs	Dark Green	Dark Green	Dark Green	Medium Green	Medium Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	
	Chicken	Dark Green	Dark Green	Dark Green	Medium Green	Medium Green	Very Light Green	Very Light Green	Very Light Green	Very Light Green	

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⁵ Recipe yields 100 g of porridge from 93.6 g water, 16.5 g maize flour, and 4.7 g sugar.



Key⁶ ■ Unaffordable ■ Moderately affordable ■ Affordable

6 Unaffordable (affordable to 0–50% of households); Moderately affordable (affordable to 51–90% of households); and Affordable (affordable to 91–100% of households).

CONCLUSIONS

This analysis has shown that complementary feeding gaps in energy, animal-source protein, iron, and calcium cannot be affordably filled by all households, particularly the lowest-spending 10–15%. These households rely on the cheapest available staple foods and struggle to meet energy and nutrient requirements. Almost all households in the lowest decile and around half in the second-lowest decile cannot afford to meet 50% of young children’s energy, iron, and calcium needs through the nutritious foods studied here. Meeting animal-source protein needs is also challenging for most households in the bottom decile and a some in decile 2. While a dietary gap in vitamin A persists, it is not primarily due to affordability: almost all households can afford enough foods rich in vitamin A (beef liver, carrots, spinach) to meet 100% of needs. Above the bottom two deciles, there is at least one food that can be used to affordably meet all analyzed nutrient needs for 70–100% of households, meaning that many households could meet nutrient needs without further interventions to address affordability. Although price reductions could help some households afford more nutritious foods, many households in the bottom deciles would still be unable to afford the foods they need to feed their children a diet meeting all nutrient requirements. Further analysis is thus needed of the potential for increased home production of nutritious foods and other options, such as commercial and point-of-use fortification as well as supplementation. Transfers (cash or in-kind) could also be useful in the short term for food-insecure households. **Groundnuts** (energy), **kidney beans** (energy, iron), **spinach** (iron, calcium, vitamin A), **small dried fish** (protein, calcium, energy, iron), **beef liver** (vitamin A), **carrots** (vitamin A), and **milk** (energy, protein, calcium) are the most affordable nutritious foods to fill gaps in young children’s diets. They should be the focus of initiatives aimed at increasing the production, desirability, and consumption of nutritious complementary foods.

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