AFFORDABILITY OF NUTRITIOUS COMPLEMENTARY FOODS IN **ZAMBIA**

December 2019

gain Global Alliance for Improved Nutrition

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WHY DOES AFFORDABILITY OF COMPLEMENTARY FOODS MATTER IN ZAMBIA?

Zambia is a landlocked lower middle-income country in Southern Africa with a population of nearly 18 million in 2019 (1). While economic growth was strong in the 2000s, reaching levels as high as 10% annually, it has slowed to around 3% in recent years (2), and 54% of the population is still below the national poverty line (3). The agriculture sector employs 55% of the workforce but only accounts for 8% of GDP (3). Low agricultural productivity and limited crop diversity are drivers of undernutrition and impact affordability of nutritious foods (4). Overreliance on maize presents a potential food security risk, and crop diversification is a policy priority (4). Child undernutrition is widespread, with 40% of children under five stunted and 78% of children under two not consuming an adequately diverse diet (5).

Many children in the complementary feeding period (ages 6–23 months) in Zambia do not consume enough iron, vitamin A, calcium, zinc, vitamin B_{12}, folate, and animal-source protein, which hinders growth and development (6). 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 Zambia are rich in nutrients lacking in young children's diets. However, resource-constrained households (the lowest spending 30–40%) struggle to afford enough of these nutritious foods to meet even 50% of their 6–23-month-old children's dietary requirements for energy, protein from animal sources, iron, calcium, and zinc.
- Zinc is the least affordable nutrient, with half of households unable to purchase enough zinc-rich foods to meet 50% of requirements for young children.
- About 10–15% of households face affordability barriers to meeting young children's folate requirements.
- While dietary gaps in vitamins A and B_{12} persist, they are not primarily due to affordability: almost all households can afford enough foods rich in these nutrients to meet 100% of needs.
- The most nutritious affordable foods to fill nutrient gaps are **groundnuts** (energy, zinc), **dried beans** (zinc, folate, energy, iron), **dark green leafy vegetables** (iron, calcium, folate, vitamin A), **small dried fish** (calcium, protein, zinc), **frozen or fresh fish** (protein), **beef liver** (vitamin A, vitamin B_{12}), and **chicken liver** (iron, folate, vitamin B_{12}, zinc, vitamin A).
- 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 2015 Living Standards Measurement Survey (LSMS) (7), we divided 2,054 households with children aged 6–23 months 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.[1] 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, calcium, zinc, vitamin B_{12}, and folate for their 6–23-month-old children through specific foods. Specific foods were chosen because of their nutrient content and availability in Zambia. 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 (8). 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 obtained from reports published by the Zambia Central Statistical Office (9). If a household's re-allocable food expenditure exceeded the total weekly cost of a food portion for all 6–23-month-old children in that household, then that food portion was considered affordable.

HOUSEHOLD EXPENDITURE AND CONSUMPTION PATTERNS

On average, households spent 58% of their total expenditures on food. Purchases made up 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 seven times lower than in the average household and 20 times lower than in the highest decile. Households in the four lowest deciles also obtained a smaller share (50–57%) of their food from purchases than the highest-spending households, which obtained almost all of their food from purchases. Households with children aged 6–23 months allocated most of their food expenditure to meat, fish, and eggs; vegetables; and cereal products (Figure 1). Although expenditure on *meat, fish, and eggs* exceeded expenditure on cereal products and vegetables, the quantities purchased of these animal-source foods were smaller due to their relatively

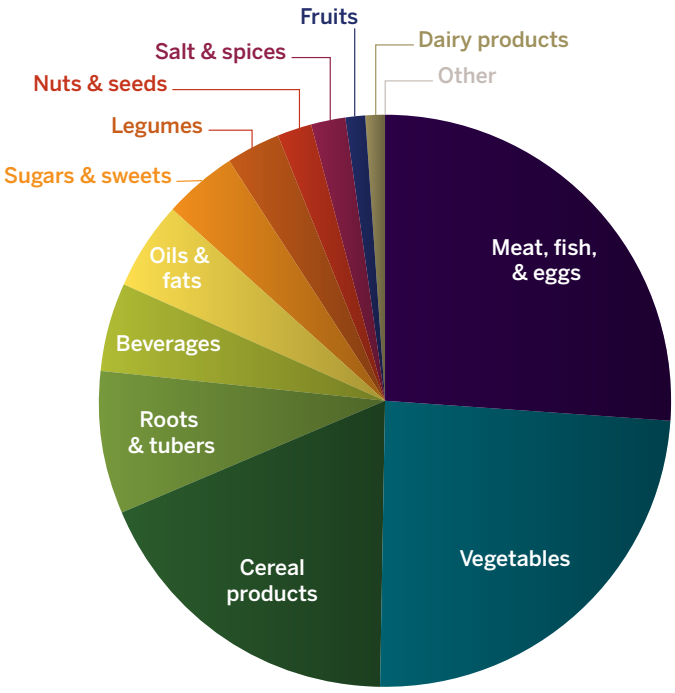

Figure 1. Breakdown of total food expenditures

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

higher prices. Maize was by far the most heavily consumed cereal, with almost 80% of households consuming maize in the past two weeks (48% of which was maize meal). Leafy greens were the most frequently consumed vegetable (consumed by 94% of households in the past two weeks) and were often obtained from households' own production.

AFFORDABILITY BY NUTRIENT

Energy

No households in the bottom three deciles and few in the fourth 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; many households in the fifth and sixth deciles and almost all in the top four deciles are able to afford enough groundnuts to meet 50% of young children's energy needs. Most households (except in the two lowest deciles) 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 three deciles and some in the bottom four are unable to meet 50% of young children's protein requirements from animal sources. Frozen or fresh fish, small dried fish (kapenta), and chicken are the most affordable animal sources of protein but are only affordable to most households above decile four or five. Even if the price of fish was halved, it would be unaffordable to households in the bottom two deciles, whereas most households in the top five deciles can afford to choose between any of the seven protein-rich foods included in the analysis to meet their young children's animal-source protein needs.

Iron

All households in the bottom two deciles and many in deciles three and four 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 pumpkin leaves, which are the most affordable source 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 chicken liver to meet iron needs, and other animal-source foods are only affordable to households in the highest 1–3 deciles. Commercial and point-of-use fortification, biofortification, supplementation,[2] and increased home production are also options for supplying additional iron to diets.

Vitamin A

Vitamin A only presents an affordability barrier to a small fraction of households in the lowest decile. Almost all households can afford enough beef liver to satisfy 50% of vitamin A needs. Rape greens, pumpkin, chicken liver, and carrots are also affordable to a large majority of the population.

2 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 four deciles. Dried kapenta is the most affordable option for meeting calcium needs and is affordable for some households in the third and fourth deciles and most in deciles 5–10. Calcium-rich foods (dried kapenta, rape greens, fresh milk,[3] and sour milk) are not typically consumed from own production, thus absent interventions to encourage increased home production, they would need to become more affordable through raised incomes or price reductions.

Zinc

The lowest spending 40–50% of households face affordability barriers to meeting children's zinc needs through food. Dried beans and beef, the most affordable options, are only available to most households in deciles 5–6 and above. In deciles 6–10, households have more options for meeting zinc needs. Even with a 50% price reduction for dried beans, however, 25–30% of households would be unable to meet 50% of young children's zinc needs.

Vitamin B_{12}

Most households even in the bottom decile are able to affordably meet young children's vitamin B_{12} needs via beef liver. Chicken liver is affordable to almost all households in the second decile and above, and dried kapenta and fresh or frozen fish are affordable to most households in the third decile and above. Most households in the top six deciles could also choose from fresh milk, beef, eggs, and sour milk to meet their young children's vitamin B_{12} needs. For some households in decile one, other interventions will likely be needed and could include fortification, price reductions, or home production.

Folate

Folate presents an affordability challenge to all households in the lowest food expenditure decile and some in the second lowest. Most households in deciles 2–10 can afford to purchase dried beans in sufficient quantities to meet their young children's folate needs. However, the lowest-spending households would be unable to afford adequate quantities of dried beans even if the price dropped by 50%. Spinach is the next most-affordable option, but only for households in decile 3 and higher.

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

Table 1. Proportion of households per decile able to afford foods meeting 50% of daily requirements of children 6–23 months

Nutrient	Item	Food expenditure decile 1	2	3	4	5	6	7	8	9	10
Energy	Maize porridge[4]										
	Groundnuts										
	Dried beans										
	Eggs										
	Fresh milk										
	Sour milk										
	Beef										
	Chicken										
	Dried kapenta										
Protein	Frozen fish										
	Dried kapenta										
	Chicken										
	Eggs										
	Beef										
	Fresh milk										
	Sour milk										
Iron	Pumpkin leaves										
	Dried beans										
	Chicken liver										
	Beef liver										
	Dried kapenta										
	Beef										
Vitamin A	Beef liver										
	Rape greens										
	Pumpkin										
	Chicken liver										
	Carrots										
	Eggs										
	Dried kapenta										
	Fresh milk										
	Sour milk										
	Frozen fish										

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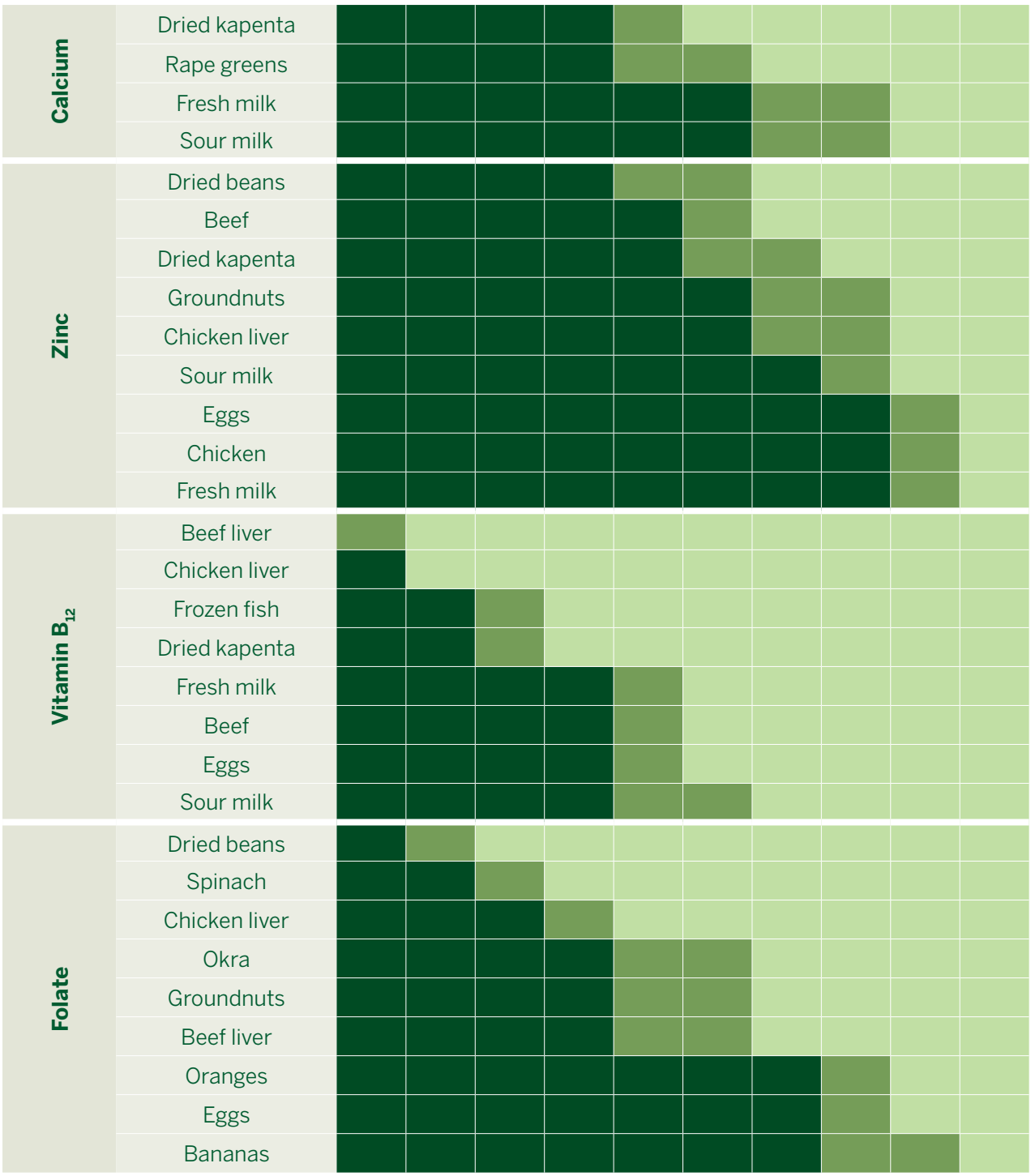
4 Recipe yields 100 g of porridge from 93.6 g water, 16.5 g maize flour, and 4.7 g sugar.



Key[5] Unaffordable Moderately affordable Affordable

5 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 zinc, animal-source protein, iron, calcium, and folate cannot be affordably filled by all households, particularly the lowest-spending 30–40% (for all but folate, which is slightly more affordable). These households rely on the cheapest available staple foods and struggle to meet energy and nutrient requirements. Almost half of households cannot afford to meet 50% of young children's energy and zinc needs through the nutritious foods studied here, and calcium, iron, and animal-source protein remain challenging for many households. Although price reductions could help some households afford more nutritious foods, 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. While dietary gaps in vitamins A and B_{12} persist, they are not primarily due to affordability: almost all households can afford enough foods rich in these nutrients to meet 100% of needs. **Groundnuts** (energy, zinc), **dried beans** (zinc, folate, energy, iron), **dark green leafy vegetables** (iron, calcium, folate, vitamin A), **small dried fish** (calcium, protein, zinc), **frozen or fresh fish** (protein), **beef liver** (vitamin A, vitamin B_{12}), and **chicken liver** (iron, folate, vitamin B_{12}, zinc, vitamin A) 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.

REFERENCES

1. The World Bank. Zambia Country Overview. 2019. https://www.worldbank.org/en/country/zambia/overview.
2. The World Bank. GDP growth (annual %) Data. 2018. https://data.worldbank.org/indicator/ny.gdp.mktp.kd.zg.
3. Central Intelligence Agency. The World Factbook, Africa: Zambia. 2019. https://www.cia.gov/library/publications/the-world-factbook/geos/za.html.
4. Marjolein M, Harris J. Agriculture, food systems, diets and nutrition in Zambia. 2017. https://pubs.iied.org/pdfs/G04163.pdf.
5. Zambia Central Statistical Office, Ministry of Health, and ICF. Zambia Demographic and Health Survey 2018: Key Indicators. Rockville, Maryland, USA, 2019. https://dhsprogram.com/pubs/pdf/PR113/PR113.pdf.
6. GAIN and UNICEF. Comprehensive Nutrient Gap Assessment (CONGA): Findings for children 6–23 months in Zambia. GAIN. Geneva, Switzerland, 2019.
7. Republic of Zambia Central Statistics Office. Zambia Living Conditions Monitoring Survey VII 2015. 2017. http://catalog.ihsn.org/index.php/catalog/7105/related_materials.
8. Semba RD, Shardell M, Sakr Ashour FA, Moaddel R, Trehan I, Maleta KM, Ordiz IM, Kraemer K, Khadeer MA, Ferrucci L, Manary MJ. Child Stunting is Associated with Low Circulating Essential Amino Acids. EBioMedicine, 2016; 6:246–52.
9. Republic of Zambia Central Statistics Office. The Monthly, July 2015. http://www.zamstats.gov.zm/index.php/publications/category/7-2015.
10. Lott M, Callahan E, Welker Duffy E, Story M, Daniels S. Healthy Beverage Consumption in Early Childhood: Recommendations from Key National Health and Nutrition Organizations. Consensus Statement. Durham, NC: Healthy Eating Research, 2019. https://healthyeatingresearch.org/wp-content/uploads/2019/09/HER-HealthyBeverage-ConsensusStatement.pdf.

Recommended citation

GAIN and UNICEF. Affordability of nutritious complementary foods in Zambia. GAIN. Geneva, Switzerland, 2019.

Acknowledgements

This briefing paper was written by Theresa Ryckman, Heather Kelahan, and Ty Beal. It was produced by GAIN and UNICEF under the Regional Initiatives for Sustained Nutrition and Growth (RISING) program, supported by the Bill & Melinda Gates Foundation and the Ministry of the Foreign Affairs of the Netherlands. We thank nutrition teams in UNICEF ESARO and Headquarters for their helpful feedback on earlier drafts; Eric Djimeu Wouabe and Saul S Morris for their contribution to the methods; and Stella Nordhagen and Sharada Keats for their help framing this briefing paper series. Cover photo credit: ©GAIN.

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