Food Prices for Nutrition: measuring the cost and affordability of healthy diets

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Agenda

1. Vision, aims and motivation
2. About the Food Prices for Nutrition project
3. Food Price data and metrics
4. Sampling of global results
5. Malawi results
6. What's next?
Vision

Food security is when all people, at all times, have physical and economic access to sufficient, safe, nutritious food to meet dietary needs and food preferences for an active and healthy life.

– World Food Summit, 1996

Physical and economic access

Includes availability and affordability

Nutritious food to meet dietary needs

Dietary needs go beyond nutrient needs; dignity, culture, protection of health

How can we be accountable to this vision without understanding availability and affordability of healthy diets?
An important link between agriculture and nutrition

*A nutritious food to meet dietary needs*
Market reliance in Malawi

- Nationally, 45-60% of calories, protein, iron, zinc, vit A, folate came from purchases in 2016/17
  - In urban areas, 80-85%
  - In rural areas, around 50%

Average share (%) of calories from different sources, 2016-2017

<table>
<thead>
<tr>
<th>Source</th>
<th>All</th>
<th>Rural</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Purchased</td>
<td>58.3</td>
<td>49.4</td>
<td>85.0</td>
</tr>
<tr>
<td>Own-produced</td>
<td>29.6</td>
<td>36.4</td>
<td>9.2</td>
</tr>
<tr>
<td>Gift</td>
<td>11.2</td>
<td>13.3</td>
<td>4.9</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>0.9</td>
<td>0.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Source: Adapted from Gilbert, Benson, Ecker 2020
Even rural farm families rely on market purchases for healthy, diverse diets. Evidence from rural Ethiopia.

**Source of calories consumed by month, 2010-11**

- **Own production**
- **Purchased**

**Shares of food consumed, by food group**

- Cereals
- Tubers
- Legumes
- Vegetables
- Fruits
- Eggs
- Fish
- Meat
- Milk

Source: Adapted from Sibhatu and Qaim, 2017
Aims: what do we want to know?

- If you went to an average market in Malawi, how much would it cost to obtain a healthy diet?
- How many people in Malawi can afford that cost?
We estimate three least-cost diets using retail prices

- “Energy sufficient diet” - Cost of Calorie Adequacy (CoCA)
  minimum cost to meet energy requirements using the least expensive, available starchy staple food in each country

- “Nutrient adequate diet” - Cost of Nutrient Adequacy (CoNA)
  minimum cost to meet energy and nutrient requirements (23 macro and micro-nutrients, with upper as well as lower bounds)

- “Healthy diet” - Cost of Healthy (Recommended) Diet (CoRD)
  Minimum cost to meet food-based dietary guidelines, based on food group classifications; a behaviorally realistic way to meet nutrient needs and other needs, including proportionality, norms, culture, and protection of health against NCDs
Least-cost diets

• Most affordable (cheapest, lowest cost) combination of foods that meet the criteria of these diets

• These diets provide a conservative estimate (lower bound) on the cost per day
  • Preferences or convenience would add to the cost

• No standard “food basket”
  • Foods chosen depend on time and place
  • Seasonal or locally-available foods selected
When healthy diets are unaffordable, food prices are an insurmountable barrier to improved diet quality.

Source: Food Prices for Nutrition, October 2020
How does Food Prices for Nutrition differ from other initiatives?

- Emphasis on monitoring
- Focus on leveraging the abundance of data collected in existing national (CPI) and international monitoring systems
  - Support countries to calculate metrics within their own data systems
- Moving beyond nutrients to look at healthy diet patterns
- Cost of a Healthy Diet does not rely on linear programming → relative ease of computation
WFP Fill the Nutrient Gap

has focused on the nutrient-adequate diet (CotD) to date

**Align** stakeholder priorities to:
- Create synergies
- Leverage opportunities towards multi-sectoral actions to improve diets

**Engage multi-sectoral** platforms to:
- Strengthen &
- Reposition actions across the food system and environment

**Inform Government policies and UN country strategy & programming** to improve delivery on nutrition
Specifics of the
Food Prices for Nutrition project
Food Prices for Nutrition is…

• A four-year project to promote use of food prices to measure diet costs and affordability (2020-2024)

• Building on two previous projects to develop the price indices and diet cost metrics
  • Indicators of Affordability for Nutritious Diets in Africa (IANDA, 2015-2017)
  • Changing Access to Nutritious Diets in Africa and South Asia (CANDASA, 2017-2020)
PURPOSE: Scale up monitoring and analysis of food prices, to guide agricultural production and food markets for improved nutrition

- Provide tools and methods for users to calculate the metrics
- Support use of the metrics within countries
- Support use of the metrics across countries
- Model impacts of policies and programs that could affect food prices
- Global online hub on food prices for nutrition
- Training courses hosted by the World Bank
Focus countries

1. Bangladesh
2. Burkina Faso
3. Ethiopia
4. Ghana
5. India
6. Malawi
7. Nigeria
8. Pakistan
9. Tanzania
Food Prices for Nutrition team

Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy

https://sites.tufts.edu/foodpricesfornutrition/team/
Food Prices for Nutrition (FPN) online hub

- A one-stop shop to access the project’s results, underlying data used, and accompanying methodological documentation
  - Provide downloadable diet cost and affordability indices + possible food price data with registration
  - Disseminate protocols and software tools, designed for use along with the FPN eLearning materials on OLC
  - Maximize visibility and use of these data by national governments and development agencies.
- To be located within the World Bank websites:
  - Access via data.worldbank.org (4.3M visits, the last 52 weeks) and icp.worldbank.org (36k visits, the last 52 weeks)
Food Prices for Nutrition (FPN) eLearning course

- Hosted on the World Bank’s Open Learning Campus (OLC) platform
  - The OLC is an open-access online platform of the World Bank – knowledge sharing to global and national policy makers
  - Since 2015, the OLC has offered over 450 courses covering different themes and reaching more than 250k learners in 190 countries
- 180-minute self-paced course to train government officials, program planners, researchers, and others
  - Construction of diet cost indices (Module 1)
  - Use and potential applications of diet cost indices in relation to policy making (Module 2)
  - Self-paced course using narration, text, visualizations, video interviews by subject experts, worked examples and summary quizzes
- Official launch by August 31st, 2022
Data, Metrics and Methods
## Data inputs needed

<table>
<thead>
<tr>
<th>Data types</th>
<th>Calorie Adequacy (CoCA)</th>
<th>Nutrient Adequacy (CoNA)</th>
<th>Healthy/Rec. Diets (CoRD)</th>
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<tbody>
<tr>
<td>Price data</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Energy requirements</td>
<td>X</td>
<td>X</td>
<td></td>
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<tr>
<td>Nutrient requirements</td>
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<td>Food composition data</td>
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<tr>
<td>Dietary guidelines</td>
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Food price data: national governments’ CPI data

• Main data are food prices collected by national governments
• Used for measuring inflation via Consumer Price Index (CPI)

• Generally, these prices are collected:
  • By national statistical offices
  • At nationally representative market locations
  • On a monthly basis

• CPI is generally weighted by share of total expenditure, so culturally acceptable, commonly consumed food items are tracked
Food price data: global dataset

- World Bank’s **International Comparison Program (ICP)** dataset
  - A worldwide statistical initiative led by the World Bank in partnership with other international organizations
  - Data collected primary for estimating purchasing power parities (PPPs) for the world’s economies
  - The ICP 2017 global item list included **208** foods & beverage items + regional specific list
  - Items limited to comparable products sold in multiple countries with high-level of comparability and quality
  - Provides a national annual average price per item
Other price data sources

• Household expenditure survey data
  • Used to calculate food unit costs for purchased items
  • Caveat: Surveys done every 5-10 years in many countries

• Market information systems (MIS) typically track farm-gate, wholesale, and/or retail prices of commodities for producers and traders
  • Ministries of Agriculture or Trade may have this system
  • Caveat: usually does not include processed foods

• Vulnerability assessments track consumer prices to guide interventions
  • World Food Programme Vulnerability Assessment and Mapping system (VAM)
  • Famine Early Warning System network (FEWS NET)
  • Caveat: In most cases, a small number of items are included
Calculating the Cost of Nutrient Adequacy
## Data inputs needed

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<td>X</td>
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<td>Nutrient requirements</td>
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<td>X</td>
<td></td>
</tr>
<tr>
<td>Food composition data</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Dietary guidelines</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Data inputs needed: Food composition data

- Provides nutrient and calories for each food
- Edible portion info needed to adjust for weight of items like pit of avocado, banana peels
- Detailed nutrient data only necessary for cost of nutrient adequate diet (CoNA)

Source: MAFOODS, 2019
Data inputs needed: Energy and nutrient requirements

- **Estimated energy requirements (EERs)** based on age, sex, and level of physical activity
  - Median weights and heights of the World Health Organization (WHO) reference population
- **Macronutrients**
  - Protein, fats, carbohydrates from the Acceptable Macronutrient Distribution Range (AMDR)
- **Micronutrients**
  - Global harmonized average requirements and upper levels (Allen, Carriquiry and Murphy, 2019)
  - Sodium: Chronic Disease Risk Reduction Intake (CDRR) limits (IOM, 2006)
- Linear programming used to determine the lowest cost combination of foods that meet requirements

Calculating the Cost of a Healthy Diet
### Data inputs needed

<table>
<thead>
<tr>
<th>Data types</th>
<th>Calorie Adequacy (CoCA)</th>
<th>Nutrient Adequacy (CoNA)</th>
<th>Healthy/Rec. Diets (CoRD)</th>
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<td>Price data</td>
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<td>Energy requirements</td>
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<tr>
<td>Nutrient requirements</td>
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<td>Food composition data</td>
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</tr>
<tr>
<td>Dietary guidelines</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Food-based dietary guidelines (FBDG)

- >90 countries have FBDG
- Many FBDG are not quantitative
- Malawi does not have its own FBDG
- FAO maintains FBDG repository

Source: Herforth, et al., 2019
Calculating the cost of a healthy diet

1. Categorize each food in food price list according to the food groups in the selected FBDG

2. Remove the following items:
   - Those not required for a healthy diet (e.g. sweets, sugar sweetened beverages, condiments)
   - Remove duplicate items, keeping only the lowest cost item (i.e., keep local rice, drop imported rice)

3. Multiply price/kg by the amount required per day in kg (accounting for edible portion), to find the price per day for each item

4. Take the average of the 1-3 lowest cost items (price/day) in each food group
   - 1 item for oils, 2 for fruits, 3 for veg

5. Sum the cost of all food groups
Affordability of diets

- Affordability: Comparison of cost to a defined income standard

1. Poverty lines
   - National
   - International (US $1.90)

2. Expenditures (food, total)

3. Incomes

4. Wages
   - Compared to unskilled wages in India, Ethiopia
Sampling of Results
Healthy diets *by any definition* are far more expensive than the entire international poverty line of $1.90...let alone the upper bound portion of the poverty line that can credibly be reserved for food of $1.20.
Calorie affordability is still a problem in some countries. Most people in sub-Saharan Africa and South Asia cannot afford healthy diets.

3 billion people globally lack sufficient income to purchase the *least-cost* form of healthy diets recommended by national governments.

- 1.3 billion people
- 596 million people
- 326 million people
- 829 million people

Calorie affordability is still a problem in some countries.

Most people in sub-Saharan Africa cannot afford nutrient adequate diets.

Most people in sub-Saharan Africa and South Asia cannot afford healthy diets.
### Overview of SOFI 2020 results in focus countries (USD)

<table>
<thead>
<tr>
<th>Country</th>
<th>Energy sufficient diet</th>
<th>Nutrient adequate diet</th>
<th>Healthy diet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost (USD)</td>
<td>% of food exp</td>
<td>% pop. cannot afford</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>0.64</td>
<td>14.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>0.45</td>
<td>28.2</td>
<td>0.1</td>
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<tr>
<td>Ethiopia</td>
<td>0.58</td>
<td>40.5</td>
<td>1.7</td>
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<tr>
<td>Ghana</td>
<td>0.82</td>
<td>50.1</td>
<td>5.3</td>
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<td>India</td>
<td>0.79</td>
<td>27.3</td>
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<tr>
<td>Malawi</td>
<td>0.28</td>
<td>21.9</td>
<td>1.3</td>
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<tr>
<td>Nigeria</td>
<td>0.94</td>
<td>15.8</td>
<td>33.3</td>
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<tr>
<td>Pakistan</td>
<td>0.77</td>
<td>20.9</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Tanzania</td>
<td>0.58</td>
<td>21.7</td>
<td>5.60</td>
</tr>
</tbody>
</table>

Source: FAO et al., 2020

“Ladder of affordability” – cost of diet rising
Results from Malawi
Do remote rural people pay higher prices for more nutritious foods?

Stevier Kaiyatsa
Economist, Ministry of Economic Planning and Development
Using price data from the National Statistical Office

- Use food prices to compute calorie sufficient and nutrient adequate diets in Malawi

- Prices for 55 food items collected over 129 months from 2007-2017 in 29 locations
  - 17 markets at the centre of the district – “boma” / “rural town”
  - 12 markets away from the centre of the district – “remote”
Comparison of nutrient and caloric adequacy, by market type (2007-2017)

- Difference in overall cost of a nutritious diet is about 8% higher in boma markets (1.61 USD/day in 2011 US$ PPP terms) than in rural markets (1.48 USD) (p<0.001)

<table>
<thead>
<tr>
<th>Index</th>
<th>Type of Market</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>t-statistic</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>More remote markets</td>
<td>1.48</td>
<td>0.807</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Boma markets</td>
<td>1.61</td>
<td>0.82</td>
<td></td>
<td></td>
<td>-4.429***</td>
</tr>
<tr>
<td></td>
<td>CoNA</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>CoCA</td>
<td>0.75</td>
<td>1.29</td>
<td>1.01</td>
<td>2.41</td>
<td>-4.054***</td>
</tr>
</tbody>
</table>

*, **, *** indicates a statistically significant difference in mean price in US$ of CoNA and CoCA by type of market at the 10%, 5%, and 1% levels, respectively.
Overall findings

- Costs of energy sufficient and nutrient adequate diets are systematically lower in more remote rural markets than boma markets.

- Differences due to lower prices in several food categories in rural remote markets:
  - Dried chambo and utaka
  - Beef
  - Powdered milk
  - Chicken eggs

- Only fresh chambo is systematically more expensive in more rural remote markets.
Seasonality of diet costs in Malawi

Yan Bai
Consultant, World Bank, ICP team
Spatiotemporal variation of CoNA in Malawi

- 5 districts had seasonal intensity > 20%
- Dowa - seasonal intensity of 35%
- Relatively low intensity of seasonality for starchy staples
- Fruits and vegetables display significant, intense seasonality

Source: Bai, Naumova and Masters (2020)
Overall findings

- Cost of Nutrient Adequacy: 130 MWK per adult woman per day
  - USD $1.21 (2011 PPP)
  - Nutrient adequacy is 3x more expensive than subsistence on maize alone

- Significant seasonality for 31 of 48 food items in Malawi
  - Fruits and vegetables generally have stronger seasonality than other food groups
  - Animal-source foods have the lowest seasonality

- Reducing & stabilizing cost of nutritious foods is important for consumers and farmers who use markets to complement what they grow

Source: Bai, Naumova and Masters (2020)
What’s next?
Next steps in Food Prices for Nutrition

• Updated estimates for SOFI 2021 expected in June/July

• Agriculture, Nutrition and Health (ANH) Academy Week Learning Lab in June

• Generating tool and guides for *data holders* to compute Cost of a Healthy Diet themselves

• World Bank eLearning course coming next year, August 2022
Food price interest groups

We will be reaching out in the coming months to share:

1. Tools to calculate the cost of a healthy diet
2. New results from the SOFI report
3. More information regarding the launch of the World Bank eLearning course

Reach out with questions or interest – Rachel.gilbert@tufts.edu

Google Form
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