Nutrition as a Basic Need

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Paper:
Kristi Mahrt, Anna W. Herforth, Sherman Robinson, Channing Arndt and Derek D. Headey (2022), 
Nutrition as a basic need: A new method for utility-consistent and nutritionally adequate food poverty lines.

At the World Bank, nutrition was conceptually linked
to poverty from the start

• 1973 Nairobi speech called World Bank to shift mission to poverty reduction
  – The main vehicle identified was rural development, or increasing the productivity of small-scale farmers
  – Nutrition was also considered as a focus...but not “bankable” enough
  – “Reducing the ravages of serious malnutrition will itself accelerate economic development and thus contribute to the amelioration of poverty.” - McNamara, 1971
...but what was meant by food security and nutrition?

- The available data were used to define the problem.
- Prevalence of malnutrition was estimated from food supply data
  - No anthropometry yet
  - Therefore low calorie supply = malnutrition

- “Although deficiency of vitamins and minerals may cause serious health problems, especially among children, the therapy is now well known and relatively easy to apply so that the magnitude of this problem is almost negligible in relation to the one created by lack of calories and proteins.”
  - Chafkin et al., 1972 Possible World Bank Actions on Malnutrition Problems

- 1973 also marked the formation of CGIAR
  - Structure: centers focused on improved productivity of the major staple crops

Things have changed!
Change in paradigm calls for different thinking about food security

1970s: Food shortage paradigm
• Lack of calories was the major problem

Now: Nutritious food shortage paradigm
• Multiple forms of malnutrition in all regions
• Diabetes and child overweight rising fastest in Africa
• Availability: Theoretically possible for everyone to eat enough, but impossible for everyone to eat nutritious diets
• How many lack access to healthy diets?

Food security definition changed in the 90s...but measurement did not.

*Food security is...*  
availability at all times of adequate world food supplies.  
- World Food Summit, 1974

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
Cost and Affordability of a Healthy Diet: indicators to understand food access

Used in the UN State of Food Security and Nutrition in the World (2020, 2021, 2022), joining other food security metrics

What is a healthy diet?

“...sufficient, safe, nutritious food to meet dietary needs and food preferences for an active and healthy life”

Based on food-based dietary guidelines (FBDG), which represent:

• a realistic way for regular people to select nutrient-adequate diets
• diets that protect health against NCDs
• diets that are dignified and culturally appropriate

In nations where FBDG have been elaborated, they are the official policy standard for what constitutes dietary needs

• social safety nets and nutrition education based on FBDG
Food access

• If you went to an average market in any country, how much would it cost to obtain a diet that satisfies dietary guidelines?
• How many people could not afford this cost?

Benin’s quantitative food-based dietary guidelines

- Food groups
- Number of portions per day
- Grams or calories per portion
Least-cost healthy diets

- Food group proportions stay constant (share of kcal)
- Food items are substitutable

**Within food groups, what are the cheapest items?**

- The answer varies by season and market.

Least-cost diets set a lower bound.
Does not necessarily select food items that are culturally essential (social inclusion)

Healthy Diets, by any definition, cost more than the poverty line

Healthy Diet Basket $3.54 in 2020
Around 3 billion people could not afford a healthy diet in 2020

Hover over interactive chart to see country data

Map source: Food Prices for Nutrition DataHub

Nutrition as a Basic Need
A new method for utility-consistent and nutritionally adequate food poverty lines

Kristi Mahrt,1 Anna W. Herforth,2 Sherman Robinson,1 Channing Arndt,1 Derek Headey1
1 – IFPRI; 2 – Co-Director of the Food Prices for Nutrition project
Motivation

- The World Bank estimates that about 8% (648 million) of the global population is $2.15/day poor, but nutritionists estimate that 25% (2 billion people) suffer from micronutrient deficiencies, 22% of children are stunted.
- Do standard poverty metrics poorly reflect nutritional needs?
- Most poor countries use the cost of basic needs approach for national poverty lines, estimating food baskets that satisfy a dietary energy standard while reflecting consumption patterns of poor households.
- But poor households consume poor diets. Lots of starchy staples, few nutrient-dense food... a circular logic: cost of basic “nutritional” needs estimated from nutritionally inadequate diets.
- Poverty measurement is still in the past paradigm of nutrition.

How to get beyond energy...
- Nutrients are not enough (Allen 2017); can use dietary guidelines (Herforth et al. 2020)
- Least-cost healthy diets (SOFI 2020 onward)
- Neither approach reflects cultural food norms of the poor (social inclusion)

Contributions

- We argue that:
  1. A healthy diet is a basic need and should replace the energy standard in costing basic-needs food poverty lines
  2. A healthy diet can be defined from food-based dietary guidelines (national policy documents), but adjusted to reflect cultural food norms of the poor
  3. Poverty estimates resulting from poverty lines that use energy-based food baskets are likely to be much lower than poverty based on a healthy-diet food baskets, and energy-based food baskets are associated with significant micronutrient deficiencies

- We apply these arguments to Myanmar (2015) but expect that our results generalize to all LMICs.
  - least-cost healthy diets – with no adjustment for preferences - have already been shown to be much more expensive than the $2.15 line
  - In short, nutrition as a basic need implies that the world is poorer than we think
Poverty measurement: Do households achieve a minimum level of wellbeing?

How do we define wellbeing? How do we quantify it?

### Welfare

utility defined over commodities and reflecting the preferences of poor/near poor households

### Cost of Basic Needs reference utility

a consumption bundle that allows individuals to

“lead a healthy and active life, including fully participating in the society” (Ravallion, 1998)

- Consumption patterns of poor/near poor households observed in household survey data
- Cultural norms & socially necessary consumption (consumption choices)
- Nutrition standard
- Essential non-food expenditures (consumption choices)

poverty line = reference utility consumption bundles evaluated at prices faced by poor/near poor HHs

= food poverty line + non-food allowance
Nutrition standard: energy-based vs healthy diet food poverty lines

Energy-based food poverty line
Food consumption by relatively poor households evaluated at median prices and scaled to meet a dietary energy target

Healthy diet food poverty line
- Food based dietary guidelines – policy documents defining diets that meet nutritional needs
- Cost and Affordability of a Healthy Diet now reported by FAO as global food security indicator, reflecting “economic access to nutritious food to meet dietary needs for an active and healthy life”
- Food consumption by relatively poor households evaluated at median prices where
  - food groups are scaled to meet food group quantities specified in dietary guidelines
  - relative shares of foods within each food group are fixed (reflects consumption patterns)
  - total food basket is scaled to meet the dietary energy target

Minimum cost linear programming diets and the FAO’s minimum “cost of a healthy diet” indicator do not incorporate consumption patterns that reflect preferences.

Being classified as non-poor in terms of a healthy diet is distinct from consuming a healthy diet.

Utility consistent regional poverty lines
Tension between two principles used in estimating poverty lines

Utility consistency:
poverty lines should represent the same reference utility level across time and space

Specificity:
poverty lines should reflect local conditions – relative prices, availability, norms

Arndt and Simler – method for estimating utility consistent regional poverty lines

Regional food poverty lines
Estimate regional food poverty lines based on regional consumption patterns and nutrition target

Revealed preference theory
Identify inconsistencies in utility levels across regions by testing revealed preference conditions

Cross entropy criterion
Enforce revealed preference constraints while preserving, to the greatest degree possible, the information content of the initial food poverty baskets
Myanmar case study

Regional variation in diets – important consequences for poverty measurement

- diverse climates, agro-ecologies, and ethnic traditions affect diets

2015 Myanmar Poverty Living Conditions Survey LSMS style survey (MoPF and World Bank, 2017)

- nationally representative household survey
- 7-day recall of 154 food items

Sub-national poverty line regions

<table>
<thead>
<tr>
<th>State/Regions</th>
<th>Number of households</th>
<th>Number of relatively poor households: energy-based poverty</th>
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<tbody>
<tr>
<td>Hills and Mountains</td>
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Food based dietary guidelines for Myanmar

<table>
<thead>
<tr>
<th>Food Groups</th>
<th>Average number of servings</th>
<th>Serving size (grams)</th>
<th>Recommended average quantity (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starchy staples</td>
<td>11</td>
<td>30</td>
<td>330</td>
</tr>
<tr>
<td>Pulses</td>
<td>1.5</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>Meat/Fish/Eggs</td>
<td>2.5</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Dairy and substitutes</td>
<td>1.5</td>
<td>150</td>
<td>225</td>
</tr>
<tr>
<td>Dark green leafy vegetables</td>
<td>1.5</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>3</td>
<td>100</td>
<td>300</td>
</tr>
<tr>
<td>Fruits</td>
<td>2</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Fats</td>
<td>4.5</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Discretionary foods</td>
<td>5</td>
<td>5</td>
<td>25</td>
</tr>
</tbody>
</table>

Adapted from the Food Based Dietary Guidelines for Bangladesh (Nahar et al., 2013).

- Myanmar does not have completed, quantified guidelines for the general population
- Use neighboring Bangladesh’s guidelines
- Low dairy consumption and widespread small fish/crustation availability and consumption
  - dairy food group adapted to include calcium-rich small fish and dried crustaceans
- Average quantities correspond well with an adult women’s energy needs (kcal)
Results

Food basket energy shares

Energy-Based

- Starchy Staples 73%
- Discretionary Foods
- Fats
- Fruit
- Vegetables
- Dairy
- Meat/Fish/Eggs
- Pulses

Healthy Diet

- Starchy Staples 54%
- Discretionary Foods
- Fats
- Fruit
- Vegetables
- Dairy
- Meat/Fish/Eggs
- Pulses
Food basket cost shares

Energy-Based

Healthy Diet

Energy-based and healthy diet baskets are both aligned with consumption patterns of poor households and the energy target.

Healthy diet baskets are also aligned with healthy diet guidelines.
Poverty

Poverty Rate
(% of population)

Depth of poverty
(poverty gap as a % of poverty line)

Energy-based poverty line
Healthy diet poverty line

Distribution of total expenditure

energy-based poverty line
($3.16)

healthy diet poverty line
($4.69)
Energy-based poverty line falls far short of nutrient needs

<table>
<thead>
<tr>
<th>Nutrient Assumptions outlined in the paper.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAR (estimated average requirements) obtained from Allen et al. (2020).</td>
</tr>
<tr>
<td>Various food composition tables: Stadlmayr et al. (2012); Shaheen et al. (2013); Institute of Nutrition (2014); MEXT (2015); USDA (2016); Scott (2019).</td>
</tr>
</tbody>
</table>

### % of EARs for a 30-year old woman

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>EAR</th>
<th>Energy-based</th>
<th>Healthy diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein, g</td>
<td>33</td>
<td>152</td>
<td>207</td>
</tr>
<tr>
<td>Calcium, mg</td>
<td>750</td>
<td>46</td>
<td>110</td>
</tr>
<tr>
<td>Iron, mg</td>
<td>11</td>
<td>100</td>
<td>136</td>
</tr>
<tr>
<td>Magnesium, mg</td>
<td>265</td>
<td>89</td>
<td>137</td>
</tr>
<tr>
<td>Phosphorous, mg</td>
<td>580</td>
<td>132</td>
<td>172</td>
</tr>
<tr>
<td>Zinc, mg</td>
<td>9</td>
<td>85</td>
<td>105</td>
</tr>
<tr>
<td>Copper, mg</td>
<td>1</td>
<td>200</td>
<td>266</td>
</tr>
<tr>
<td>Vitamin C, mg</td>
<td>80</td>
<td>27</td>
<td>212</td>
</tr>
<tr>
<td>Thiamin, mg</td>
<td>0.9</td>
<td>79</td>
<td>119</td>
</tr>
<tr>
<td>Riboflavin, mg</td>
<td>1.3</td>
<td>21</td>
<td>82</td>
</tr>
<tr>
<td>Niacin, mg</td>
<td>11</td>
<td>105</td>
<td>128</td>
</tr>
<tr>
<td>Vitamin B6, mg</td>
<td>1.3</td>
<td>92</td>
<td>130</td>
</tr>
<tr>
<td>Folate, μg</td>
<td>250</td>
<td>71</td>
<td>166</td>
</tr>
<tr>
<td>Vitamin B12, μg</td>
<td>2.0</td>
<td>27</td>
<td>146</td>
</tr>
<tr>
<td>Vitamin A, μg RAE</td>
<td>490</td>
<td>76</td>
<td>136</td>
</tr>
</tbody>
</table>

Nutrient assumptions outlined in the paper. EAR: nutrient intake that satisfies the needs of half the healthy individuals in a specified age-gender group.

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**Poverty vs Diet Affordability**

**Total poverty line relative to total expenditure:**

<table>
<thead>
<tr>
<th>Poverty rate (% of population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>48</td>
</tr>
<tr>
<td>56</td>
</tr>
</tbody>
</table>

**Cost of food bundle relative to food expenditure:**

<table>
<thead>
<tr>
<th>Inability to afford the diet (% of population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>64</td>
</tr>
</tbody>
</table>

Energy-based Healthy diet

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**Figure 2. Energy shares of energy-based and healthy diet baskets, by food group**

- Energy-based
- Healthy diet

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**Figure 3. Poverty rate and cost of food bundle relative to diet affordability**

- National
- Urban
- Rural

Energy-based Healthy diet
Conclusions

Summary

The energy based-standard typically used to define food poverty lines

- Results in a basket severely deficient in most essential nutrients
- Undercounts the share of the population unable to meet basic needs

The healthy diet standard

- Generally, meets nutrient needs while aligning with foods typically consumed
- Satisfies the long-standing aim of the cost of basic needs approach, as a standard within which it is possible for people to “lead a healthy and active life, including fully participating in the society”
- Follows the cost of ‘basic needs’ use of consumption patterns to reflect preferences
  - in contrast to minimum cost linear programming diets or the “cost of a healthy diet”
- In countries with national food based dietary guidelines, aligns with established national policy
- Aligns with an internationally recognized food security indicator recently adopted by FAO “cost of a healthy diet”
Discussion

Limitations
- Would people shift consumption to different items if they were trying to limit costs?

Feasibility
- The healthy diet food poverty line methodology can be implemented using a single national food bundle or using the utility consistent regional food bundle approach.

Limitations Implications
- Many more people should be counted as poor, if the standard accounts for the cost of healthy diets as opposed to just dietary energy.
- Using the healthy diet standard helps to explain the large disconnect between poverty and malnutrition rates
  - Affordability is just one barrier to eating healthy diets.
  - Availability, accessibility, and desirability are also driving factors in diets.
- However, if people cannot afford to eat healthy diets, difficult to argue that their basic needs are met.

Thank you!


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