Innovative Methods and Metrics for Nutrition Research and Programming

Looking Beyond a Decade of Accomplishments in Nutrition
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Use of Accelerometer Devices to Capture Energy Expenditure in Agricultural and Rural Livelihoods

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THE IDEA
THE CONTRIBUTION

Energy expenditure

Food intakes

Time-use / activity

Field manual for practitioners [LINK]
• Examine the effect of “drudgery reduction” – the substitution of less intense for more intense physical activity in rural livelihoods – on energy requirement in India.

• Drudgery reduction can have large effects on human energy (calorie) requirements, with an hour of drudgery reduction reducing energy requirements by 17-24% for men and 14-17% for women in India.

• Effects of drudgery reduction vary by gender and socio-demographic characteristics, and these factors must be considered in the promotion of new agricultural technologies.

GENDER, TIME-USE, AND ENERGY EXPENDITURES

• Explore **patterns of time and energy intensity** of rural livelihoods work across the gendered allocation and trade-offs of both energy expenditure and time-use across productive tasks, reproductive work, and leisure in India and Nepal.

• Men and women participate equally in productive work, however **women shoulder most of the reproductive work burdens in rural households at the expense of leisure opportunities**.

• The design of agricultural interventions should pay attention to how they may impose **gender specific demands on energy exertion and time**.

INTRA-COUPLE TIME ALLOCATION EFFECTS ON ENERGY ADEQUACY

• Assess couple’s own and partner effects of time allocation (economic, domestic, leisure activities) on energy adequacy.

• There are spousal interdependencies in the correlation of time allocation with calorie intake adequacy and gendered allocation of work is negatively linked with calorie intake adequacy.

• Development efforts can minimize nutrition trade-offs to women empowerment by encouraging cooperation between spouses and a change in socio-cultural norms around the gendered allocation of work may be required for achieving desirable nutritional outcome.

A NEW TOOL FOR POLICIES AND PROGRAMS

• New technologies (accelerometers) offer the opportunities to collect new or better data; does not imply replacing on-the-ground data collection; rather complement current approaches.

• The methods and approach can be used to facilitate a better understanding of:
  • The link between agricultural development interventions and nutrition outcomes for different members of rural households.
  • The intra-household, gender differentiated labour allocation and energy expenditure patterns.
  • The prevalence, depth and severity of undernutrition in rural areas in developing countries.
Food Prices:
How Value Chains, Policies and Programs Affect the Affordability of a Healthy Diet

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Early work for the Nutrition Innovation Lab in Uganda established that even the lowest-cost nutrient adequate diet is often far out of reach, with high volatility and spatial variation.

Policy implications: prices and incomes; availability; nutrition education

What have we learned about how well food markets work for the poor?

Foods with healthy attributes are too costly for the poorest, and affordable but often not chosen by richer people.

- **Healthy diets (balance of food groups)**: Least-cost way of meeting dietary guidelines costs around $3.50/day, with much variation.
- **Nutrient adequacy (balance of macro & micronutrients)**: Least-cost diet has legumes, some F&V, little ASFs. Cost is around $2.00/day, with some variation.
- **Daily energy (calories)**: Least-cost items are starchy staples (also vegetable oil and sugar). Cost is around $0.75/day, with some temporal and spatial variation.

Other factors (time use and kitchen equipment, taste and preferences, advertising etc.)
Diet composition varies, but each step up in quality adds to the cost

Cost of the most affordable diets for energy sufficiency, nutrient adequacy and overall health by country income group in 2017

- Cost of survival ≈ $0.75/day
- Cost of nutrient adequacy ≈ $2.00/day
- Cost of recommended diets > $3.50/day

The least-cost items in each place generally have similar prices for lower- and higher-income people

Smaller step up, due primarily to lower prices for dairy

Differences in affordability are mainly due to income distribution

Cannot afford sufficient daily energy
(global total ≈ 185 million, ave. cost = PPP$0.79)

Cannot afford a nutrient-adequate diet
(global total ≈ 1.5 billion, ave. cost=PPP$2.33)

Cannot afford a healthy diet
(global total ≈ 3.0 billion, ave. cost=PPP$3.75)

About 3 billion people (38% of the world population) could not afford a healthy diet in 2017

Monitoring diet cost and affordability complements other ways of measuring poverty and food insecurity:
≈ 690 m. below $1.90/day (World Bank)
≈ 653 m. undernourished (PoU, from 1960s)
≈ 1.9 b. experience food insecurity (FIES)

Latest updates (through 2019) are here:

Within countries we see some similarities and some differences

Energy shares of least-cost diets

Seasonality of diet costs and cost by food group in Tanzania, Malawi and Ethiopia

COVID brought higher food prices due to higher farm-to-retail margins

Monthly change in global consumer price indexes for food versus other items (180 countries, Jan. 2019 – Feb. 2021)

3% rise in real food CPI since March 2020 (and does not follow commodity prices)

Association with cumulative COVID case counts

Larger (5%) rise in countries with higher case counts

Source: Bai, Y. et al., Food prices in a pandemic: Global data show higher costs for nutritious food groups (2021). https://doi.org/10.21203/rs.3.rs-710555/v1.
New work includes other costs of meal preparation, not just food items

Cost per serving of cooking fuel, relative to the cost of dried beans in East Africa

Note: Data shown are the nationally-representative retail price of 57.25g for the most affordable kind of pulse, which in each country is spotted beans, compared to the cost of fuel using quantities from MECS (2019) and prices from ICP (2021) as detailed in the text.
Conclusions:
What do we know about diet costs and affordability?

• For many people (3 billion, 40% of world), healthy diets remain beyond reach
  – Perishable or bulky foods are more costly to grow and distribute than starchy staples, oil and sugar
  – Affordability requires income growth and safety nets, as well as food system change to lower prices

• For most people (4.9 b., 60%), healthy diets are affordable but not chosen?
  – Price barrier is not insurmountable; other factors often drive choice
    • meal preparation (time, fuel, water, equipment)
    • preferences (food culture, taste and satiation)
    • marketing of packaged foods (availability and advertising)
  – COVID lowered income and raised food prices, but magnitude is not yet known

• Research on diet costs is evolving rapidly!
  – Increased data availability and standardized methods
  – Greater depth of spatial, temporal and demographic variation