BACK TO THE FUTURE: A DECADE OF THE NUTRITION INNOVATION LAB

Patrick Webb, PhD.
16 Sep 2021
“There is an urgent need to provide evidence-based information on food-based strategies and systems for enhanced nutrition.”  


“The logic of the transmission mechanisms between agricultural production and nutritional outcomes is not…clear.”  


“The most urgent gaps relate to…multisectoral interventions addressing food availability and household economics that have not yet focused on reducing undernutrition.”  

Nepal Nutrition Assessment & Gap Analysis (2009)
We need “innovative and rigorous evaluation designs as alternatives to RCTs to measure impacts and understand causality in agri-health interventions.”
UNDERSTANDING THE PATHWAYS: Collaborative Research Support Program (CRSP)

Female Diet Quality

Reduced Anemia
Iron and folate

Reduced LBW

Improved food and water safety

Reduced child stunting?
Reduced wasting episodes?
CAPACITY BUILDING
Academic and technical training, skills labs and workshops, curriculum accreditation, study design

Metrics Innovation
New indices (NGI), new methods (energy expenditure), testing approaches (dried blood spots, cognitive outcomes)

RESEARCH
Building rigorous evidence base for multisector programming, agriculture interventions, food safety

ENGAGEMENT
Policymakers, practitioners, donors, scientific peers, private sector innovators
▪ Agriculture-to-nutrition pathways.

▪ Biological Mechanisms impacting nutrition.

▪ Technologies, markets, innovations.
Larger survey samples, stronger results

- **Nepal**: 10,000+ hhs
- **Mozambique**: 1,254 children
- **Jordan**: 4,430 women+service providers
- **Uganda**: 8,160 hhs
- **Bangladesh**: 3,060 hhs

Many studies (cohorts and panels) included 4-9 repeat rounds: e.g., Uganda birth cohort involved 7 rounds generating >18,000 data points; Nepal’s AflaCohort was 9 rounds = 14,669 data points.
MULTISECTOR PROGRAMMING IMPACTS ON NUTRITION

**BETTER NUTRITION**
- Not always… timeframe matters, and content of multisector package.
- Some gains only for children >24m.
- Cognitive outcomes also improved (ASQ)
- Effects work through birth outcomes, LBW, SGA, head circumference.

**IMPROVED DIETS**
- Significant rise in: Women’s diet diversity (DD), child’s DD, ASF intake, minimum intake of key food groups.
- Sustained intake of >2 ASFs = 10% less stunting in Bangladesh, 16% less in Nepal.

**MARKET ENGAGEMENT**
- Women engaged in value-add food production and sales (more distant markets).
- Affordability and proximity both improve diets, choice enhanced by SBC, income and own production.

**FARM DIVERSIFICATION**
- Livestock species: up 31%***
- Linking horticulture with aquaculture increases income and intake of both
- Taking loans; joining finance groups: farm + nonfarm investment
- Women’s empowerment from cash cropping

**ADOPTING PRACTICES**
- Row planting: up 15%***
- Fallow rotation: up 11%**
- Pest management: up 7%***

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SECTOR INVESTMENTS TAKE DIFFERENT TIMES TO MATURE AND TO CONTRIBUTE TO NUTRITION
Maternal EED = shorter gestation and baby stunted @birth

Maternal AfB1 = SGA, baby stunted @birth, low WAZ, low head circumf.

Child AfB1 associated with higher ochratoxin A, and with higher EED.

Child AfB1 @birth = lower weight @3m, lower WHZ @6m

Child EED associated with poor linear growth, high DON, low iron status
IMPROVED FOOD PROCESSING AND STORAGE FOR IMPROVED NUTRITION

- **T**: Traditional storage
  - Child DD, 0.17***
  - Child HAZ, 0.02

- **D**: Improved drying methods & tools
  - Child DD, 0.15***
  - Child HAZ, 0.03***

- **P**: Improved processing
  - Child DD, 0.12**
  - Child HAZ, 0.03**

- **IS**: Improved storage
  - Child DD, 0.152***
  - Child HAZ, 0.04***

- Buried pits, smoking of pots, chemical cleaners, sacks on floor.
- Sun drying on tarps, solar chimneys, smoking on racks.
- Screening out low-quality grains, removing mold, filleting fish.
- Scrubbing out containers, hermetically sealed bags, sealed sacks/airflow.
CAPACITY BUILDING

- **61** PhDs and Masters’ degrees.
- Worked with **52** non-US universities.
- Engaged in government processes.
- Organized **~140** workshops, seminars, training on study methods.
- Active support to USAID GLEEs.
- Support to other ILs relating on nutrition, study design, proposals.
Building Capacity: From Study Design to Publication Skills

- ~140 peer-reviewed publications
- Involving 91 non-US co-authors
- 28 co-authors from SSA and MENA
- 50+ more in the pipeline
- 63 co-authors from Asia
- Covering >12 distinct topic domains
METRICS INNOVATIONS

- Index of nutrition ‘governance’.
- Energy expenditure.
- Cellphone use as proxy for food security.
- Resilience measure for nutrition security.
The U.S. Government’s Global Hunger & Food Security Initiative

Land Preparation (Week 1)

Seeding and Sowing (Week 2)

Maintenance (Week 3)

Harvest (Week 4)
Nutrition Governance Index

A one-point increase in the Index is significantly associated with a 12% higher average HAZ in children >24 months old two years later.

### CHILD-LEVEL ESTIMATES

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
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<tbody>
<tr>
<td>Intercept</td>
<td>-1.49***</td>
<td>-1.70***</td>
<td>-1.64***</td>
<td>-1.68***</td>
<td>-0.75***</td>
<td>-1.92***</td>
<td>-1.86***</td>
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<tr>
<td>Child’s age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>&gt;24 months</td>
<td>-1.51***</td>
<td>-1.52***</td>
<td>-1.51***</td>
<td></td>
<td>0.14***</td>
<td>0.14***</td>
<td>0.0</td>
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<tr>
<td>≤ 24 months</td>
<td>Ref</td>
<td>Ref</td>
<td>Ref</td>
<td></td>
<td>Ref</td>
<td>Ref</td>
<td>R</td>
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<tr>
<td>Female child</td>
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<td>-0.02</td>
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<td>0.03</td>
<td>0.03</td>
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<tr>
<td>CDDS^</td>
<td>-0.14***</td>
<td>-0.14***</td>
<td>-0.14***</td>
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<td>-0.02***</td>
<td>-0.02***</td>
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<tr>
<td>No fever*</td>
<td>0.04***</td>
<td>0.05**</td>
<td>0.05**</td>
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<td>0.13***</td>
<td>0.14**</td>
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<tr>
<td>Month of birth</td>
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<td>Mother’s education</td>
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<td>0.04***</td>
<td>0.04***</td>
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<td>0.01***</td>
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<tr>
<td>Mother’s BMI</td>
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<tr>
<td>Mother’s age</td>
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<td>-0.00*</td>
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### COMMUNITY-LEVEL ESTIMATES

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<tbody>
<tr>
<td>NGI (Z-score)</td>
<td>-0.02</td>
<td>-0.09</td>
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<td>-0.05</td>
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<td>NGI (Z-score) &amp; child’s age</td>
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<tr>
<td>NGI &amp; &gt;24 months</td>
<td>0.12***</td>
<td>Ref</td>
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<td>NGI &amp; ≤ 24 months</td>
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<tr>
<td>Panel 2</td>
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<td>-0.07***</td>
<td>-0.07***</td>
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<td>Panel 4</td>
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### COVARIANCE PARAMETERS

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<td>Intercept</td>
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<td>ICC</td>
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### MODEL FIT STATISTICS

- **AIC**: 42546.8, 37608.4, 37601.8, 37574.4, 30878.9, 27854.5, 27843.0
- **N**: 12950, 11910, 11910, 11910, 11046, 10148, 10148

Namirembe et al. (forthcoming)
ENGAGEMENT

- Direct and frequent interaction with policymakers.
- Close collaboration with in-country researchers.
- Global and national involvement in dialogues.
- Engagement with non-US donors.
EXAMPLES OF ENGAGEMENT EFFECTIVENESS

Building Blocks: accreditation and tools (Malawi)
Curriculum and training (Bangalore)
Catalyzing cross-ministry collaboration (Nepal’s mycotoxin strategy)
Helping build nutrition into other IL programs (Hort-IL; PHL-IL)
Supporting innovation (RFS’ food systems framework)

www.free-powerpoint-templates-design.com
LEVERAGING OTHER DONORS AND OTHER INNOVATION LAB WORK

- Post-Harvest Losses Lab
- Small-scale Irrigation Lab
- UNICEF
- DFID, Gates
- BFS, Mission
- BFS, CSI, Mission
- EA-RB, BFS
- UNICEF, AusAid
- USAID/OFPP
- Mission, BFS
- Mission
- Peanut & Mycotoxin Lab
- HortLab
KEYS TO N-IL SUCCESS

TEAMWORK WITH COMMON VISION

POLICY ENGAGEMENT

COMMITMENT TO RIGOR

TRANSLATION OF SCIENCE
Which Investment Levers to Pull Next for Improved Nutrition?

Shaping the Drivers: Market level actions

Influencing the Food Environment

Food Safety; Food System Technologies

Beyond Stunting