Scaling up nutrition-specific interventions to prevent undernutrition in India: How much would it cost?

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with

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Financial support: Bill & Melinda Gates Foundation
The challenge: gaps exist in status of nutrition-specific actions in India

- Early Initiation of Breastfeeding
- Exclusive BF (0-6 Months)
- Introduction of CF at 6-9 Months
- 3 Expected IYCF Practices
- Iron-rich Foods
- All basic Immunisations
- Stools Safely disposed
- Vitamin A Supplementation (<3s)
- Adolescent Girls (15-19 Years) Non-Anemic*
- HH - Adequately Iodised Salt
- Diarrhea: Children Fed >= Usual
- SAM: Children with access to care

Menon, Raabe & Bhaskar, 2009
Status of essential nutrition actions is associated with the levels of stunting at the state level

Menon & Aguayo, PHFI-World Bank India Health Beats, 2011
What factors might be holding back delivery at scale?
Objectives of POSHAN costing study

1. Calculate the total cost of delivering 14 nutrition-specific actions at 100% coverage
2. Derive state-specific costs for delivering these interventions
3. Analyze, where possible, expenditures against costed amounts
Scope and Limitations

- Estimate costs in financial or budgetary terms
- Does not calculate opportunity costs of time committed by beneficiaries accessing the services
- Does not account for state-level top-up funding for programs
- Does not predict the corresponding health and nutrition outcomes that are expected to result from the scale up of services.
Approach

- All interventions recommended by the GOI
- Accounts for delivery platforms used in India
- Uses India/S. Asia-specific data on unit costs
- Most recent demographic data to estimate target populations
- Derive state-specific cost estimates
Full Coverage!

For both sets of interventions, we define “full coverage” as 100% of the target population, except in the case of treatment of severe acute malnutrition, which we set to 80%.
METHODS
Program Experience Approach

**Step 1**
- Described each intervention and define associated target population

**Step 2**
- Estimated the size of the target population (TP) in 2014 using India’s 2011 Census, its Sample Registration System, and the National Family Health Survey III

**Step 3**
- Obtained/developed local unit cost (UC) data for each intervention

**Step 4**
- Multiplied the size of the target population by the unit cost to arrive at a total cost of implementing each intervention at 100% coverage (Total cost = UC*TP)
# List of interventions and target populations

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Target Population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Counseling actions</strong></td>
<td></td>
</tr>
<tr>
<td>Counseling during pregnancy</td>
<td>Pregnant women</td>
</tr>
<tr>
<td>Counseling for breastfeeding</td>
<td>Caregivers of children 0-6 months of age</td>
</tr>
<tr>
<td>Counseling for CF and hand washing</td>
<td>Caregivers of children 6-24 months of age</td>
</tr>
<tr>
<td><strong>Supplementary food</strong></td>
<td></td>
</tr>
<tr>
<td>Complementary food supplements</td>
<td>Children 6-36 months of age</td>
</tr>
<tr>
<td>Supplementary food rations</td>
<td>Pregnant and lactating women</td>
</tr>
<tr>
<td>Additional food rations for severely malnourished children</td>
<td>Children 6-59 months of age with WAZ &lt; -3</td>
</tr>
<tr>
<td><strong>Micronutrient supplementation and deworming</strong></td>
<td></td>
</tr>
<tr>
<td>Iron-folic acid supplements</td>
<td>Pregnant and lactating women for six months</td>
</tr>
<tr>
<td>IFA and deworming supplements</td>
<td>Adolescents 11-18 years of age</td>
</tr>
<tr>
<td>Iron supplements for children</td>
<td>Children 6-59 months of age</td>
</tr>
<tr>
<td>Vitamin A supplements</td>
<td>Children 6-59 months of age</td>
</tr>
<tr>
<td>ORS and zinc for diarrhea</td>
<td>Children 2-59 months of age with diarrhea</td>
</tr>
<tr>
<td>Deworming</td>
<td>Children 12-59 months of age</td>
</tr>
<tr>
<td><strong>Health interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Treatment of severe acute malnutrition</td>
<td>Children 6-59 months of age with a WHZ &lt; -3</td>
</tr>
<tr>
<td>Insecticide treated nets</td>
<td>Pregnant women in malaria endemic areas</td>
</tr>
<tr>
<td><strong>Miscellaneous interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Maternity benefit for breastfeeding mothers</td>
<td>Six months after delivery</td>
</tr>
</tbody>
</table>
## Unit Costs: Counseling Activities

<table>
<thead>
<tr>
<th>Counseling Activities</th>
<th>Cost per beneficiary per year (US$)</th>
<th>Cost per beneficiary per year (INR)*</th>
<th>Source of costing data</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counseling during pregnancy</td>
<td>0.80</td>
<td>41.6</td>
<td>Alive &amp; Thrive costing study, Bangladesh**</td>
<td>Assumes 3.5 contacts</td>
</tr>
<tr>
<td>Counseling for breastfeeding for children 0-6 months of age</td>
<td>1.05</td>
<td>65.1</td>
<td>Alive &amp; Thrive costing study, Bangladesh</td>
<td>Assumes 11.7 contacts</td>
</tr>
<tr>
<td>Counseling for complementary feeding and hand washing for children 6-12 months of age</td>
<td>4.72</td>
<td>292.64</td>
<td>Alive &amp; Thrive costing study, Bangladesh</td>
<td>Assumes 11.6 contacts</td>
</tr>
<tr>
<td>Counseling for complementary feeding and hand washing for children 12-24 months of age</td>
<td>1.52</td>
<td>94.24</td>
<td>Alive &amp; Thrive costing study, Bangladesh</td>
<td>Assumes 13.5 contacts</td>
</tr>
</tbody>
</table>

* Exchange rate as of October 10, 2013. US$ 1 = INR 62
# Unit Costs: Supplementary Food

<table>
<thead>
<tr>
<th>Supplement</th>
<th>Cost per beneficiary per year (US$)</th>
<th>Cost per beneficiary per year (INR)*</th>
<th>Source of costing data</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complementary food supplements for children 6-12 mths</td>
<td>14.52</td>
<td>900</td>
<td>MWCD 2013 revised norms for supplementary nutrition</td>
<td>Rs 6 per day; Daily ration provided for 6 months, 6 days a week</td>
</tr>
<tr>
<td>Complementary food supplements for children 12-36 mths</td>
<td>29.03</td>
<td>1800</td>
<td>MWCD 2013 revised norms for supplementary nutrition</td>
<td>Rs 6 per day; Daily ration provided for 12 months, 6 days a week</td>
</tr>
<tr>
<td>Supplementary food rations for pregnant and lactating women</td>
<td>16.94</td>
<td>1050</td>
<td>MWCD 2013 revised norms for supplementary nutrition</td>
<td>Rs 7 per day; Daily ration provided for 6 months during pregnancy and 6 months during lactation, 6 days a week</td>
</tr>
<tr>
<td>Additional food rations for severely malnourished children</td>
<td>13.06</td>
<td>810</td>
<td>MWCD 2013 revised norms for supplementary nutrition</td>
<td>Rs 9 per day; Daily ration provided for 3 months. 50% of children 6-35 months with SAM are subtracted from the target population</td>
</tr>
</tbody>
</table>

* Exchange rate as of October 10, 2013. US$ 1 = INR 62
RESULTS
Total annual cost of implementing the full set of interventions at full coverage

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Cost (INR crore) per year</th>
<th>Cost (US$ million) per year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Counseling actions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Counseling during pregnancy</td>
<td>307.58</td>
<td>49.61</td>
</tr>
<tr>
<td>Counseling for breastfeeding</td>
<td>110.79</td>
<td>17.87</td>
</tr>
<tr>
<td>Counseling for CF and hand-washing</td>
<td>1,361.27</td>
<td>219.56</td>
</tr>
<tr>
<td><strong>Supplementary food</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food supplements for children 6-36 months</td>
<td>9,461.26</td>
<td>1,526.01</td>
</tr>
<tr>
<td>Supplementary food rations for pregnant and BF women</td>
<td>4,081.77</td>
<td>658.35</td>
</tr>
<tr>
<td>Additional food rations for severely malnourished children</td>
<td>688.45</td>
<td>111.04</td>
</tr>
</tbody>
</table>
Total annual cost of implementing the full set of interventions at full coverage

<table>
<thead>
<tr>
<th>Action</th>
<th>Cost (INR crore) per year</th>
<th>Cost (US$ million) per year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Micronutrients and deworming</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron-folic acid supplements for pregnant and BF women</td>
<td>122.95</td>
<td>19.83</td>
</tr>
<tr>
<td>IFA supplements and deworming for adolescents</td>
<td>249.18</td>
<td>40.19</td>
</tr>
<tr>
<td>Iron supplements for children 6-36 months of age</td>
<td>248.12</td>
<td>40.02</td>
</tr>
<tr>
<td>Vitamin A supplementation</td>
<td>46.93</td>
<td>7.57</td>
</tr>
<tr>
<td>ORS and therapeutic zinc supplements for treatment of diarrhea</td>
<td>440.14</td>
<td>70.99</td>
</tr>
<tr>
<td>Deworming</td>
<td>138.94</td>
<td>22.41</td>
</tr>
<tr>
<td><strong>Health interventions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment of severe acute malnutrition</td>
<td>1,382.48</td>
<td>222.98</td>
</tr>
<tr>
<td>Insecticide treated nets for pregnant women in malaria-endemic areas</td>
<td>153.51</td>
<td>24.76</td>
</tr>
<tr>
<td><strong>Miscellaneous interventions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternity benefit for breastfeeding mothers</td>
<td>17,978.33</td>
<td>2,899.73</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>36,771.64</strong></td>
<td><strong>5,930.91</strong></td>
</tr>
</tbody>
</table>
Breaking the costs down: by intervention category

- Counseling: 5%
- Supplementary food: 39%
- Micronutrients and deworming: 4%
- Health interventions: 3%
- Maternity benefit: 49%
Breaking the costs down, by state

TOTAL (INR crore per year)
Nutrition sensitive intervention areas

• Cost Estimates for Public Distribution System
  – Current PDS Cost: US$ 14.7 billion/year (Khera)
  – PDS Costs under National Food Security Act: US$21.3 billion/year (Chakrabarti and Rajkhowa, IFPRI, 2014)
    • Highest costs for UP, West Bengal and Bihar
  – These are not costs for making NFSA-PDS nutrition-sensitive

• Cost components to scale up toilets and toilet use (Arghyam)
  – Toilet subsidy: $200/household x ~110 million households (?)
    • >$22 billion
  – Behavior change communication costs: unknown
  – Maintenance costs: unknown
Take-away messages

- **US$5.9 billion/year or 37,000 crores/year** to deliver nutrition-specific interventions.
- Maternity benefit and supplementary food account for the largest proportion of costs
- **Uttar Pradesh** requires the greatest amount of resources
- Costing estimates are challenged by **limited unit-cost data**
- Government expenditure reports do not align estimated costs to reported expenditures, **gaps difficult to compute.**
- Nutrition sensitive areas need more attention
Thank you!
How do costed amounts compare to expenditure? (Supplementary nutrition program in 2012-13)

<table>
<thead>
<tr>
<th>Beneficiary Age Group</th>
<th>Current Expenditure Estimate</th>
<th>Cost Estimate for Current Coverage Levels and GoI Cost Norms</th>
<th>POSHAN Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-36 months children</td>
<td>882.6</td>
<td>1202.6</td>
<td>1526</td>
</tr>
<tr>
<td>Pregnant &amp; lactating Mothers</td>
<td>257.7</td>
<td>387.8</td>
<td>658.4</td>
</tr>
<tr>
<td>SAM Children</td>
<td>35.4</td>
<td>53.3</td>
<td>111</td>
</tr>
</tbody>
</table>

Source: MWCD website, reported expenditures
The ICDS in 2014 - Budget Allocations, Norms and Coverage

- **New Expenditure Norms**: SNP is now funded through a 50:50 (GOI:State) ratio
- **ICDS Budget Allocation from GOI** is **US$ billion 3.2 for 2014-15**
  Expenditure shortfall highest for Kerala (50%) and Punjab (42%)
  Expenditure surplus highest in Andhra (22%), Bihar (23%) and Maharashtra (18%)
- **Coverage**:
  Highest coverage in Odisha (74%), West Bengal (65%) and UP (61%).
  Lowest coverage in Rajasthan (28%), Kerala (25%) and Bihar (18%)

Source: Accountability Initiative (AI)
A look at the ICDS in 2014 - Performance

• **Reported malnourished children:**
  As of December 2013, 28% of ICDS beneficiaries (children) in India were malnourished.
  This is an improvement from FY 2009-10, when 37% were reported malnourished.

• **Over burdened AWCs:**
  AWCs in Uttar Pradesh and Bihar cater to over 100 children.
  In Bihar on average 1 service providing AWC caters to 194 children.
  In contrast, each AWC in Himachal Pradesh services 23 beneficiaries

Source: Accountability Initiative (AI)
Comparing Costs to Expenditure (SNP in 2012-13) – the role of unit cost/expenditure gaps

<table>
<thead>
<tr>
<th>Beneficiary Age Group</th>
<th>Effective Unit Cost based on current expenditure and current coverage</th>
<th>POSHAN Unit Cost Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per child 6-12 months of age per year</td>
<td>$10.66;</td>
<td>$14.52</td>
</tr>
<tr>
<td>Cost per child 12-36 months of age per year</td>
<td>$21.31</td>
<td>$29.03</td>
</tr>
<tr>
<td>Cost per pregnant woman</td>
<td>$12.42</td>
<td>$16.93</td>
</tr>
<tr>
<td>Cost per mother of a child 0-6 months of age per year</td>
<td>$12.42</td>
<td>$16.93</td>
</tr>
<tr>
<td>Cost per severely underweight child 6-36 months of age per year</td>
<td>$9.58</td>
<td>$13.06</td>
</tr>
</tbody>
</table>
Comparing Costs to Expenditure (SNP in 2012-13) – the role of beneficiary coverage gaps

<table>
<thead>
<tr>
<th>Beneficiary Age Group</th>
<th>Number of beneficiaries (2012-13)</th>
<th>Estimated number of beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-36 months children</td>
<td>4,60,26,328</td>
<td>5,79,15,229</td>
</tr>
<tr>
<td>Pregnant &amp; lactating mothers</td>
<td>1,90,82,210</td>
<td>3,88,86,721</td>
</tr>
<tr>
<td>SAM Children</td>
<td>67,56,665</td>
<td>85,01,956</td>
</tr>
</tbody>
</table>

**BOTTOMLINE:** CURRENT EXPENDITURES ARE LOWER BOTH BECAUSE OF LOWER EFFECTIVE UNIT COSTS AND LOWER COVERAGE OF BENEFICIARIES
Efficiency: How to do more at the least cost?

- Supplementary food (US$ 2295 million)
- Maternity cash benefit (US$ 2900)
- BCC (US$ 288 million)
- Micronutrients and deworming (US$ 210 million)
- Health intervention (US$ 248)

Requires ~US$ 5 billion at scale! Requires less than US$ 1 billion at scale!

Start with ensuring 100% coverage of Micronutrient and Health interventions
# Methods: Unit Costs: Micronutrients and Deworming

<table>
<thead>
<tr>
<th>Micronutrient or Deworming Intervention</th>
<th>Cost per beneficiary per year (US$)</th>
<th>Cost per beneficiary per year (INR)*</th>
<th>Source of costing data</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFA supplements for pregnant women</td>
<td>0.51</td>
<td>31.4</td>
<td>Micronutrient Initiative’s National Investment Plan</td>
<td></td>
</tr>
<tr>
<td>Weekly IFA supplements + deworming for girls 11-18 years</td>
<td>0.40</td>
<td>25</td>
<td>UNICEF India’s Adolescent Anemia Control Program</td>
<td>Includes the cost of IFA supplements, deworming, and counseling</td>
</tr>
<tr>
<td>Iron supplementation for children 6-36 months</td>
<td>0.37</td>
<td>23</td>
<td>Micronutrient Initiative’s National Investment Plan</td>
<td>This is the GOI’s current expenditure on iron supplementation per beneficiary</td>
</tr>
<tr>
<td>Vitamin A supplementation</td>
<td>0.07</td>
<td>4.04</td>
<td>Micronutrient Initiative’s National Investment Plan</td>
<td>2 rounds per year</td>
</tr>
<tr>
<td>Therapeutic zinc supplements for diarrhea</td>
<td>0.25</td>
<td>15.8</td>
<td>Micronutrient Initiative’s National Investment Plan</td>
<td></td>
</tr>
<tr>
<td>Deworming</td>
<td>0.23</td>
<td>14</td>
<td>NRHM PIPs</td>
<td>2 doses per year</td>
</tr>
</tbody>
</table>

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## Methods: Unit Costs: Health & Misc. Interventions

<table>
<thead>
<tr>
<th>Health Intervention</th>
<th>Cost per beneficiary per year (US$)</th>
<th>Cost per beneficiary per year (INR)*</th>
<th>Source of costing data</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunizations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility-based SAM treatment</td>
<td>107.38</td>
<td>6657.5</td>
<td>Ministry of Health and Family Welfare 2011 Operational Guidelines</td>
<td>Provided to 15% of children with SAM; Assumes a 12.5 day stay</td>
</tr>
<tr>
<td>Insecticide-treated nets for pregnant women</td>
<td>4.84</td>
<td>300</td>
<td>UNICEF</td>
<td>ITNs are only distributed in highly malaria-endemic states of Assam, Odisha, West Bengal, Chattisgarh</td>
</tr>
<tr>
<td>ORS for treatment of diarrhea</td>
<td>0.38</td>
<td>12</td>
<td>NRHM PIPs</td>
<td>Average of 3 episodes/child/yr</td>
</tr>
<tr>
<td>Misc. Intervention</td>
<td>Cost per beneficiary per year (US$)</td>
<td>Cost per beneficiary per year (INR)</td>
<td>Source of costing data</td>
<td>Assumptions</td>
</tr>
<tr>
<td>Maternity benefits for breastfeeding</td>
<td>96.77</td>
<td>6000</td>
<td>2013 Food Security Bill</td>
<td>Rs 1000 per month for 6 months provided to all new mothers, except those employed in government sector</td>
</tr>
</tbody>
</table>

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# SUN interventions and target populations

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Target Population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavior change interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Community nutrition programs for behavior change communication</td>
<td>Children 0-59 months of age</td>
</tr>
<tr>
<td><strong>Micronutrient and deworming interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Vitamin A supplementation</td>
<td>Children 6-59 months of age</td>
</tr>
<tr>
<td>Zinc supplementation</td>
<td>Children 6-59 months of age</td>
</tr>
<tr>
<td>Multiple micronutrient powders</td>
<td>Children 6-23 months of age not receiving fortified complementary food*</td>
</tr>
<tr>
<td>Deworming</td>
<td>Children 12-59 months of age</td>
</tr>
<tr>
<td>Iron-folic acid (IFA) supplements</td>
<td>Pregnant women</td>
</tr>
<tr>
<td>Iron fortification of staple foods</td>
<td>General population</td>
</tr>
<tr>
<td>Salt iodization</td>
<td>General population</td>
</tr>
<tr>
<td><strong>Complementary and therapeutic feeding interventions</strong></td>
<td></td>
</tr>
<tr>
<td>Complementary food for prevention or treatment of moderate malnutrition</td>
<td>Twice the prevalence of underweight (WAZ &lt; -2) among children 6-23 months of age*</td>
</tr>
<tr>
<td>Treatment of severe acute malnutrition (SAM) using a Community-based Management of Acute Malnutrition (CMAM)</td>
<td>Incidence (estimated as twice the prevalence) of severe wasting (WHZ &lt; -3) among children 6-59 months of age</td>
</tr>
</tbody>
</table>