Cost Benefit Analysis: Introducing a modeling tool for Cost Benefit Analysis

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Smarter Futures, Food Fortification Initiative
Multiple Rationales for Investment in Flour Fortification

• Moral
  • Humanitarian Imperative – lives saved

• Good Governance
  • Obligation to Citizen Rights to Nutrition

• Economic Growth & Development
  • National Development Investment

Willie Sutton: Infamous Bank Robber in 1930’s USA Depression Era.
Question: Why do you rob banks?
Answer: “That’s where the money is.”
Rationale

• Development of cost benefit case for flour fortification.
• Advocacy to private sector, milling industry etc.
• Allows economists to compare flour fortification to other government programmes and health interventions
• Use as advocacy tool for policy makers in government ministries and Prime Minister Office
Methodology

• Zambia Workshop Structure  based on 2 days
• Country team representing Industry, Ministry of Health, Ministry of Trade and/or Finance, Development partners
• Country team 13 - 16 people
• Data collection by country teams prior to and during the workshop
• Country teams need to reach consensus on their own country data and statistics.
Workshop Tool

- Excel software with multiple spreadsheets
- Fixed parameters used to determine **health** and **economic** related losses based on existing literature and economic studies.
- Anemia, iron deficiency, NTDs, Vitamin A
- Specific data for countries can be used based on country official data and statistics.
Workshop Process
Determination of Economic Losses

• Objective: Determine the costs of doing nothing
• Estimate and validate country health statistics
  • Iron: Iron Deficiency, Iron Deficiency Anemia
  • Folic Acid: Neural Tube Defects and deaths
• Estimate Economic Losses
  • Iron deficiencies cause loss in economic productivity
  • Folic Acid deficiencies cause increase health care costs and economic burden on families for additional healthcare costs
• Review spreadsheet calculations and revise if required
Examples of Economic losses
The National Burden of IDA, VAD & NTD

1. Child Mortality Cost of VAD
2. Neo-Natal Mortality Cost of IDA in Pregnant Women
3. Maternal Mortality Cost of IDA in Pregnant Women
4. Mortality & Disability Cost of NTDs
5. Future Productivity Loss Due to Cognitive Deficits in Children
6. Current Productivity Loss Due to Anemia in Adult Women and Men
7. Summary: Money, Mortality

Source: Jack Bagriansky
IDA = iron deficiency anemia
VAD = vitamin A deficiency
NTD = neural tube defect
Wheat and Maize Flour Fortification: A Strategy to Lower the Burden

1. Coverage of Flour Consumption
2. Effectiveness Among Consumers
   • Flour Additional Rates
   • % RNI for Risk Groups
   • Projected Reduction in Baseline Prevalence
     • Explain why you chose that number
3. The Potential Benefits of Flour Fortification
   • Money and Lives
4. Cost of Flour Fortification
5. 10 Year Benefit Cost Ratio

Source: Jack Bagriansky
Examples of Health Impact: Fortification For NTD Prevention

<table>
<thead>
<tr>
<th>Meta-analysis published in 2010:</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
</tr>
<tr>
<td>Included 8 studies published between 2002 to 2008 by</td>
</tr>
<tr>
<td>8 different authors</td>
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<tr>
<td>5</td>
</tr>
<tr>
<td>Reflected studies using sub-national data in 5 countries:</td>
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<tr>
<td>Argentina, Canada, Chile, South Africa, USA</td>
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<tr>
<td>31 – 78%</td>
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<tr>
<td>Neural tube defect reductions ranged from 31% to 78%</td>
</tr>
<tr>
<td>46%</td>
</tr>
<tr>
<td>Overall reduction in risk of neural tube defects was 46%</td>
</tr>
</tbody>
</table>

### National Programme Evaluations

**Prevalence of Iron Deficiency and Anemia**

<table>
<thead>
<tr>
<th>Country</th>
<th>Risk Group</th>
<th>Condition</th>
<th>Pre</th>
<th>Post</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venezuela</td>
<td>Children &gt; 5yrs</td>
<td>Iron Deficiency</td>
<td>37.2%</td>
<td>15.5%</td>
<td>58.3%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anemia</td>
<td>18.1%</td>
<td>17.1%</td>
<td>5.5%</td>
</tr>
<tr>
<td><em>Costa Rica</em></td>
<td>Adult Women</td>
<td>Anemia</td>
<td>18.4%</td>
<td>10.2%</td>
<td>45%</td>
</tr>
<tr>
<td>Kuwait</td>
<td>Pregnant Women</td>
<td></td>
<td>33%</td>
<td>24%</td>
<td>27%</td>
</tr>
<tr>
<td>Oman</td>
<td></td>
<td></td>
<td>49%</td>
<td>31%</td>
<td>37%</td>
</tr>
</tbody>
</table>

* In the case of Costa Rica with a comprehensive multiple food vehicle fortification programme Iron deficiency in under 5 children has been eliminated

**Example of Health Impact**

**Iron Deficiency Effectiveness of Flour Fortification**

- *In the case of Costa Rica with a comprehensive multiple food vehicle fortification programme Iron deficiency in under 5 children has been eliminated*
# Prevalence of Vitamin A Deficiency

**Large Scale Effectiveness Trial Darjeeling, India**

<table>
<thead>
<tr>
<th>Prevalence of Vitamin A Deficiency (Serum Retinol &lt; 0.70 umol/l)</th>
<th>Pre</th>
<th>Post</th>
<th>% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Women</td>
<td>24.5%</td>
<td>23.2%</td>
<td>5%</td>
</tr>
<tr>
<td>School Age Children</td>
<td>34.5%</td>
<td>18.7%</td>
<td>46%</td>
</tr>
<tr>
<td>Adolescent Girls</td>
<td>30.1%</td>
<td>12.5%</td>
<td>58%</td>
</tr>
<tr>
<td>Pre-School Children</td>
<td>26.5%</td>
<td>22.5%</td>
<td>15%</td>
</tr>
</tbody>
</table>
WORKSHOP AGENDA

• Objectives
• Consequences of micronutrient deficiencies
• Overview of food fortification principles
• Methodology of Cost Benefit Model
• Data collection and review of data sets
• Confirmation/validation of the data sets (small working groups)
• Cost Benefit Analysis
• Recommendations
• Next steps.
WORKSHOP OBJECTIVES

• To carry out a cost benefit analysis of wheat and maize flour fortification in Zambia

• To demonstrate that a public health intervention of flour fortification has both a health benefit and an economic benefit for the national population

• To demonstrate the importance of an effective monitoring system for compliance of the law by both millers and importers

• To sensitize the ministries of the Government of Zambia on the economic benefits of flour fortification
Cost Benefit Workshops
Completed

The following regions and countries have had CBA workshops:

- CEE, Eurasia, Kosovo
- Uzbekistan
- Smarter Futures – East Africa 2013, Zambia

- Every participating country has shown an economic benefit for maize and wheat flour fortification
- Participant responses have been very positive and the workshops have resulted in flour fortification being implemented
Cost benefit analysis:
Objective, Scope, Key data sets & Expected deliverables

• Cost Benefit Analysis - Introduction
  ▪ Micronutrient malnutrition erodes the foundation of economic growth
  ▪ Scientific literature has developed “coefficients of loss” for iron deficiency, folic acid deficiency (and vitamin A deficiency)
  ▪ Application of best possible evidence from the scientific and economic literature to national health, demographic, labor and economic environment enables cost and benefit projections
  ▪ Systematic economic reviews of poor health continue to be published all the time – model allows for updated information and statistics to be used.
Cost Benefit Analysis: Objective

- Malnutrition has significant cost for the country for both future and current losses
- Future losses
  - Mortality and disability in children and consequent forgone income from future employment;
  - Deficits in child cognition, inferior school performance and depressed future productivity;
- Current losses
  - Depressed productivity in working iron deficient and anemic adults; and
  - Excess health care costs.
Cost benefit analysis: Expected deliverables

- Economic Cost of Malnutrition – over ten year period in USD;
- Cost of Food Fortification – Maize and Wheat Flour Fortification – over ten year period in USD
- Potential benefit of Food Fortification in the form of reduction in Economic Losses – over ten year period in USD
- Year by year comparative analysis of cost and benefit
- Potential Impact of Cost of Fortification on Retail Price of Maize and Wheat Flour.
For More Information

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