
Greg S. Garrett

27 January 2017
Contents

1. Magnitude of problem: hidden hunger
2. Effects of hidden hunger
3. Ways to prevent hidden hunger
4. Costs benefit to Tajikistan by addressing hidden hunger
I. Magnitude of problem: global hidden hunger (micronutrient deficiency)

I. Prevalence of iron deficiency in children and women of reproductive age, by low serum ferritin levels in Tajikistan and region

<table>
<thead>
<tr>
<th>Country</th>
<th>Survey</th>
<th>Children</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaz: NMNS-2011</td>
<td>n=1083</td>
<td>38.1</td>
<td>43.8</td>
</tr>
<tr>
<td>Kyr: NNS-2009</td>
<td>n=1413</td>
<td>44.6</td>
<td>51.0</td>
</tr>
<tr>
<td>Mon: NNS-2011</td>
<td>n=1026</td>
<td>21.4</td>
<td>28.2</td>
</tr>
<tr>
<td>Taj: NMNS-2003</td>
<td>n=1415</td>
<td>38.8</td>
<td>29.2</td>
</tr>
<tr>
<td>Uzb: NMNS-2008</td>
<td>n=2582</td>
<td></td>
<td>47.5</td>
</tr>
</tbody>
</table>

NMNS – National Micronutrient Survey
NNS – National Nutrition Study

www.gainhealth.org
I. The population at risk of inadequate zinc intake (ZnD, %) and neural tube defects (NTD, 10,000 births) in Tajikistan and region

Source: www.ffinetwork.org/country_profiles/
II. Effects of Hidden Hunger

- Poor brain development
- Poor immune function
- Various adverse physical outcomes (e.g. spina bifida)
- Decreased work productivity

Within the first 1,000 days there is a “window of opportunity” of a child’s life — from conception to the age of 2 — to ensure intakes of key micronutrients and improve physical and cognitive growth which in turn will have positive impacts for life

McComb 1996, Horn 1999, 2004
II. EFFECTS OF HIDDEN HUNGER: THE VISIBLE & LESS VISIBLE CONSEQUENCES OF MICRONUTRIENT DEFICIENCY

Visible: neural tube defects (from low folic acid intakes), anaemia (low iron), goitre (low iodine intakes)

Less visible:
Reduced immunity, increased incidence and severity of Infectious illness and mortality from diarrhea, measles, malaria and pneumonia.

The consequences are not limited to health parameters alone but have far reaching effects on the economy through secondary physical and mental disabilities and altered work productivity.
II. APPROPRIATE PUBLIC HEALTH OBJECTIVE: SHIFT DISTRIBUTION OF MICRONUTRIENT INTAKES AT POPULATION LEVEL
II. APPROPRIATE PUBLIC HEALTH OBJECTIVE: SHIFT DISTRIBUTION OF MICRONUTRIENT INTAKES AT POPULATION LEVEL

This curve is meant to be illustrative of the fact that many people in the population will have inadequate dietary intakes of micronutrients and with food fortification you can move that curve towards more adequate intake, as long as people are consuming that food. Actual increase in intake would not be symmetrical across the population and would depend on the pattern of consumption of the fortified food and other sources of the nutrient in the diet.
III. SOLUTIONS: EVIDENCE-BASED, COST EFFECTIVE INTERVENTIONS

Food Fortification: Can cover entire population. Evidence of impact of large-scale food fortification include:

- Only 25 countries today remain iodine insufficient at population level largely due to salt iodization, down from 54 only 13 years ago (2)

- The prevention of hundreds of thousands of cases of NTDs in South Africa, USA, Canada (3)

- A 2015 systematic evaluation of 76 studies concluded strong evidence of measurable improvements in micronutrient status and health outcomes in women and children in LMIC (4)

- High return on investments, e.g. $30 for every $1 spent depending on micronutrient and delivery channel (5)

III. SOLUTIONS: WHEAT FLOUR FORTIFICATION WITH IRON AND FOLIC ACID

Neural Tube Defects (per 10,000): Pre and Post Fortification with Folic Acid

- Prefortification NTD per 10,000
- Postfortification NTD per 10,000

Brazil, Canada, Chile, Costa Rica, Iran, Jordan, Peru, Saudi Arabia, South Africa, USA

Adapted from FFI 2013. Folic acid in flour ranged from 1.2-2.2 mg/kg.
IV. TAJIKISTAN COST BENEFIT ANALYSIS: MALNUTRITION
COST DRIVERS

- Mortality and disability in children and consequent forgone income from future employment
- Deficits in child cognition, inferior school performance and depressed future productivity
- Depressed productivity in working but anemic adults
- Excess health care costs
### IV. COST BENEFIT ANALYSIS: GENERAL ALGORITHM

**General Algorithm for Projection of Economic Losses**

<table>
<thead>
<tr>
<th>Risk Group Population</th>
<th>Prevalence of Condition</th>
<th>Population with Deficit</th>
<th>Economically Active Population</th>
<th>Average Annual Wage</th>
<th>Coefficient Of Deficit or Loss</th>
<th>Lost Productive Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td># National Statistics</td>
<td>% from NNS</td>
<td>By Indicator and Risk Group</td>
<td>% of total Population</td>
<td>Per Year</td>
<td>% or RR From Global Literature</td>
<td>$/year</td>
</tr>
</tbody>
</table>

\[
\text{General Algorithm for Projection of Economic Losses} = \text{Risk Group Population} \times \text{Prevalence of Condition} \times \text{Population with Deficit} \times \text{Economically Active Population} \times \text{Average Annual Wage} \times \text{Coefficient Of Deficit or Loss} = \$/year
\]
IV. COST BENEFIT ANALYSIS: SCOPE

• Following, are the five health conditions covered:

<table>
<thead>
<tr>
<th>Health Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neural tube defects (NTD)</td>
</tr>
<tr>
<td>Neonatal deaths</td>
</tr>
<tr>
<td>Maternal mortality</td>
</tr>
<tr>
<td>Kids productivity loss due to ID anemia</td>
</tr>
<tr>
<td>Adult productivity loss due to ID anemia</td>
</tr>
</tbody>
</table>

• Cost estimates for 10 year period starting from 2017
• Fortification intervention covered – Wheat Flour Fortification
The economic cost of doing nothing to address micronutrient deficiencies over ten years would be **6.9 billion Tajik Somoni*** ($889 million US dollars)

If all premium and first grade wheat flour consumed in Tajikistan is fortified with iron and folic acid, it will reduce the economic loss by **2.3 billion Tajik Somoni*** ($289 million) over a 10 year period;

$1 investment will generate a return of $9 and significant social and other economic benefits for Tajikistan

(* Currency rate from March 2016)
85 COUNTRIES MANDATE FORTIFICATION OF WHEAT, MAIZE FLOUR AND/OR RICE. TAJIKISTAN CAN EASILY BE NEXT


www.gainhealth.org
The reasons for investing in fortification is the potential of our children. It is both compelling and self-evident.

Thank you.
This presentation is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of GAIN and do not necessarily reflect the views of USAID or the United States Government.