Promoting the production and consumption of micronutrient-rich crops: 
Experiences from Orange Flesheled Sweet Potatoes and Enhanced Homestead Food Production

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Overview

• Introduction to micronutrient malnutrition
  – Status
  – Consequences
  – Approaches

• Agriculture sector based approaches to combat micronutrient deficiencies: experiences from two programs
  – Promotion of orange flesheed sweet potatoes
  – Enhanced Homestead Food Production

• Reflections
# Magnitude of Micronutrient Deficiencies in Tanzania

<table>
<thead>
<tr>
<th>Children &lt;5 years</th>
<th>%</th>
<th>Women 15-49</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stunting(^1) (Zinc deficiency proxy)</td>
<td>42</td>
<td>Iodine Deficiency</td>
<td>36</td>
</tr>
<tr>
<td>Anemia(^2)</td>
<td>69</td>
<td>Anemia</td>
<td>40</td>
</tr>
<tr>
<td>Iron Deficiency(^2)</td>
<td>35</td>
<td>Iron deficiency</td>
<td>30</td>
</tr>
<tr>
<td>Vitamin A Deficiency(^2)</td>
<td>33</td>
<td>Vitamin A deficiency</td>
<td>37</td>
</tr>
</tbody>
</table>

1Children 0-59 months. 2Children 6-59 months  
Source: 2010 TDHS
Consequences of Vitamin A Deficiency (VAD)

- **In children:**
  
  poor growth and development, increased risk of infection and severity of infection, eye disorders (xerophthalmia), death

- **In pregnant women:**
  
  night blindness, miscarriage, low birth weight, premature birth, increased risk of maternal death
Integrated approaches to combat micronutrient deficiencies

- Supplementation
- Improved Crop Productivity
- Crop Bio-fortification
- Nutrition Education
- Dietary Diversification
- Food Fortification

Improved Micronutrient Status
Integrated approaches to combat micronutrient deficiencies

- Food Fortification
- Dietary Diversification
- Nutrition Education
- Supplementation
- Improved Crop Productivity
- Crop Bio-fortification

Improved Micronutrient Status
## Interventions to combat VAD

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Advantage</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vitamin A Supplementation to children 6-59 months</td>
<td>High dose twice per year, easy to reach large population and cost effectively</td>
<td>Targeted, difficult to reach the hard to reach population</td>
</tr>
<tr>
<td>2. Food fortification of oil (ex) with vitamin A</td>
<td>One input point (industry)- can reach many people every day</td>
<td>PPP, may not reach all consumers; requires enforcement</td>
</tr>
<tr>
<td>3. Bio-fortification (ex OFSP)</td>
<td>Reaches rural areas; owned and managed by farmers</td>
<td>Take time to obtain specific breeding qualities; public awareness needed</td>
</tr>
<tr>
<td>4. Dietary diversification through nutrition education</td>
<td>Long term impact; requires no external inputs</td>
<td>Requires behavior changes, takes time</td>
</tr>
</tbody>
</table>
Integrated approaches to combat micronutrient deficiencies

- Supplementation
- Improved Crop Productivity
- Improved Micronutrient Status
- Crop Bio-fortification
- Nutrition Education
- Dietary Diversification
- Food Fortification
Orange-fleshed Sweet Potatoes (OFSP)

- Orange-fleshed sweet potatoes are rich in vitamin A, with one 125 g root supplying enough vitamin A for a child under 5 for the daily requirement!
OFSP Adoption and Vitamin A Intakes

**High adoption rates** were seen over 3 years in Mozambique (77%) and two years in Uganda (65%).

OFSP intake increased resulting in **increases in vitamin A intakes**

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**Figure 5** Impact of REU Intervention on mean vitamin A intakes (µg Retinol Activity Equivalents (RAE)/day), Mozambique and Uganda

- **Mozambique**
  - Children 6-35 mths.
  - Children 3.5-6 yrs.
  - Women

- **Uganda**
  - Children 6-35 mths.
  - Children 5-7 yrs.
  - Women

- **Colors**:
  - Yellow: Impact
  - Red: Control at project end
The case of orange fleshed sweet potatoes (OFSP): What is needed

- Knowledge and awareness of benefits
- Released varieties that consumers like
- Planting material and supply system
- Technical knowledge
- Adequate funding
- Policy change
- Well designed projects covering nutrition, production and marketing
- ADVOCACY AND PROMOTION
OFSP Promotion

- Subsidized planting materials
- Decentralized vine multiplications sites
- Communication Strategy
  - Market day promos
  - Radio programs
  - Trader trainings
  - Demo plots
  - Cooking demonstrations with nutrition education
  - Gender sensitization

Crop Bio-fortification
Resources

• Sweet Potato Knowledge Portal
  http://www.sweetpotatoknowledge.org

• International Potato Center (www.cipotato.org)

• HarvestPlus www.harvestplus.org

• Helen Keller International www.hki.org

• Catholic Relief Services www.crs.org
The case of Enhanced Homestead Food Production

**Home Gardening** (vegetables & fruits & OFSP) 
+ 
**Animal Husbandry** (poultry etc.) 
+ 
Intensive Community-based **Nutrition Education** to improve the intake of micronutrient rich food among women and young children
<table>
<thead>
<tr>
<th>NUTRIENTS</th>
<th>Milk</th>
<th>Meat/Fish/Poultry</th>
<th>Eggs</th>
<th>Refined Cereals, Sugars, Oils</th>
<th>Fruits and vegetables</th>
<th>Beans, peanuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iodine</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Zinc</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>(√)</td>
</tr>
<tr>
<td>Iron</td>
<td>-</td>
<td>√</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(√)</td>
</tr>
<tr>
<td>Calcium</td>
<td>√√√</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>(√)</td>
<td>(√)</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>√√√</td>
<td>√</td>
<td>√√</td>
<td>-</td>
<td>(√√)</td>
<td>-</td>
</tr>
<tr>
<td>Folate</td>
<td>-</td>
<td>√</td>
<td>√</td>
<td>-</td>
<td>√</td>
<td>√√√</td>
</tr>
<tr>
<td>Vitamin B-12</td>
<td>√√</td>
<td>√</td>
<td>√√</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Vitamin B-2</td>
<td>√√</td>
<td>√√</td>
<td>√</td>
<td>-</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>√√√</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: HarvestPlus
## EHFP model in Tanzania

<table>
<thead>
<tr>
<th>Component</th>
<th>Technical Partner</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Home gardens</strong> established with micronutrient-rich indigenous vegetables</td>
<td>AVRDC- The World Vegetable Center</td>
<td>District Agricultural Extension Officers</td>
</tr>
<tr>
<td><strong>Poultry</strong> management courses, vaccinations, etc</td>
<td>Livestock Institutions</td>
<td>Primary Schools Agricultural Extension Officers</td>
</tr>
<tr>
<td><strong>Nutrition Education</strong> (Essential Nutrition Actions)</td>
<td>Helen Keller International and the Tanzania Food and Nutrition Center, District Nutrition Officer</td>
<td>Community Counselors and ENA Facilitators, Agricultural Extension Officers</td>
</tr>
</tbody>
</table>
Essential Nutrition Actions

- Breastfeeding
- Complementary Feeding
- Feeding of sick children
- Women’s Nutrition
- Control of Vitamin A deficiency
- Control of Anemia
- Control of Iodine Deficiency Disorders
EHFP: Basic Approaches

- Try to work through current structures to provide services (Agricultural extension officers, health workers, etc.) for long term sustainability
- Target families with young children
- Reach beneficiaries with ENA messages from various angles and contact points
- Provide OPV (non hybrid) seeds
- Monitoring program processes and generating evidence
Resources

- AVRDC- The World Vegetable Center [www.avrdc.org](http://www.avrdc.org)

- International Food Policy Research Institute [www.ifpri.org](http://www.ifpri.org)

- Tanzania Home Economics Association [www.tahea.or.tz](http://www.tahea.or.tz)

- Helen Keller International [www.hki.org](http://www.hki.org)

Conclusions

• Micronutrient deficiencies will remain high without agriculture-based nutrition interventions

• Behavior change to improve production and consumption of micronutrient rich foods is possible but requires intensive nutrition education

• If targeting the most vulnerable, focus on consumption first, then on income generation if excess is produced
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