KORARO ETHIOPIA

Cindy Pfitzenmaier, MS
Nutrition Intern
Summer 2008
Outline of Presentation

1. Overview of malnutrition
2. Introduction to Koraro
3. Work done in Koraro, Ethiopia, August 2008
   1. Assessment (not discussing today)
   2. School Meal Program
Scope of Malnutrition

- 3.5 million mothers and children under 5 die each year due to malnutrition (Lancet, 2008).
- Estimate to contribute to 1/3 of all childhood deaths, but is rarely listed as the cause (WHO, 2008).
- Lack of access to nutritious food along with poor feeding practices and infection – particularly frequent or persistent diarrhea, pneumonia, measles and malaria – also undermines a child's nutritional status.
Malnutrition Continued

- 90% of the world's un nourished children live in 36 countries (predominantly Africa)

- Integrated problem
  - Agriculture
  - Education
  - Health
  - Policy

- Critical window having the greatest impact is pregnancy to 24 months of age.
Map of Ethiopia
Koraro, Ethiopia

- Lies in Northern Ethiopia, surrounded by jagged mountains and dusty, arid land
- Cluster is comprised of 11 villages, (55,000 people)
- One of the most remote and isolated sites—very poor, almost non existent roads
  - Takes about an hour by car to reach Koraro from Hawzien, where the MVP office is located
- Major health problems include: high rates of respiratory disease, high maternal mortality, malaria and diarrhea.
Rocky, Dry, Beautiful Koraro
The School Meal
School Meal Program

Background

- **MV1-2 schools**, total 1249 students ($m=636$; $f=613$)
  - One school goes to grade 8, one to grade 4.
- **MV2—21 schools**, total 154,900 students ($m=7518$; $f=7882$);
  - One school sponsored by WFP which assists 1319 students
- Total number of students is 16,649 and all schools have SFP.
Infrastructure

- **Kitchen Structures**
  - Contracts signed for construction of kitchens and storerooms in both MV1 schools and 17 MV2 schools as of August 6, 2008.
  - Still waiting for 2 MV2 schools to sign contracts.
  - Community contributing labor and locally made bricks.
  - 45 days to complete construction of the kitchen and storeroom.

- Only one MV1 school has a well.
Meal Schedule and Details

- School Year—200 days from Sept. to June
- Shift System
  - 8:00 AM-Noon
  - 12:30 PM-4:30 PM
- Meals served for both shifts
  - 7:30 AM for first shift
  - 12:00 for second shift
- Kerosene Stoves
  - $100/stove
  - 1 barrel (200L) kerosene costs 6 Bir/day…total in all schools each year $26,000
Tasks and Challenges

Objectives

1. Improve nutritional content of meal.
2. Reduce cooking time of meal.
3. Standardize ration size.
4. Provide simple nutrition messages to the cooks.

Barriers

- Cost, availability, acceptability, ease of preparation, and salaries for cooks. Detailed attention given to:
  - Weights of foods being prepared.
  - Exact cooking time as well as preparation time.
  - Serving size calculated by weight.
  - Exact nutrient profile of each food combination.
  - Amount of fuel consumed.
  - Acceptability of food by school age children.
# Meals Tested

<table>
<thead>
<tr>
<th>Option</th>
<th>Ingredients</th>
<th>Amount</th>
<th>Total Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mugo</td>
<td>Maize</td>
<td>6.75 kg</td>
<td>4 hours, 20 minutes</td>
</tr>
<tr>
<td>2. Mugo</td>
<td>Chickpea and wheat</td>
<td>3.25 kg of each</td>
<td>1.5 hours</td>
</tr>
<tr>
<td>3. Mugo</td>
<td>Chickpea, Wheat and Beans</td>
<td>7.5 kg of chick pea and wheat (50/50) and 7.5 kg beans</td>
<td>Chickpea and wheat same as above; beans 2 hours</td>
</tr>
<tr>
<td>4. Bukuleti-germination (for 3 days)</td>
<td>Bean</td>
<td>7.5kg</td>
<td>No cooking time; eaten as is 3 days latter</td>
</tr>
<tr>
<td></td>
<td>Chickpea</td>
<td>7.5 kg</td>
<td></td>
</tr>
<tr>
<td>5. Roasting</td>
<td>Chickpea</td>
<td>750 g</td>
<td>5 minutes dry; 3 slightly wet</td>
</tr>
<tr>
<td></td>
<td>Wheat</td>
<td>300 g</td>
<td>3 min dry; 5 slightly wet</td>
</tr>
<tr>
<td>Option #</td>
<td>Ingredients</td>
<td>Ration Size</td>
<td>Kcal</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>Boiled Maize, Boiled Beans, Boiled Wheat, Boiled Chickpea</td>
<td>50 g each of grains and beans (200g)</td>
<td>352</td>
</tr>
<tr>
<td>2</td>
<td>No Maize; all other ingredients the same; plus vegetable oil</td>
<td>66.67 g of grains and beans; 20 g oil</td>
<td>476</td>
</tr>
</tbody>
</table>
## Nutritional Profile of Meals Tested

<table>
<thead>
<tr>
<th>Option #</th>
<th>Ingredients</th>
<th>Ration Size</th>
<th>Kcal</th>
<th>Protein (g)</th>
<th>Fat (g)</th>
<th>Iron (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Boiled Beans Boiled Chickpeas</td>
<td>100 g of each 20 g</td>
<td>538</td>
<td>18.3</td>
<td>23.5</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Vegetable Oil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Germinated Chickpea Germinated Beans Vegetable Oil</td>
<td>100 g 75 g 5.65g</td>
<td>642</td>
<td>28.2</td>
<td>7.0</td>
<td>17.25</td>
</tr>
</tbody>
</table>
Conclusions

Germination best method due to:
1. Improved Nutritional Quality
2. Decreased Time
3. Low Cost

Importance of Improving Nutrition at the household level
Zenebe encouraging the planting of five fruit trees around each homestead.

Each tree is watered using an upside down clay pot.
Thank You