Learning from Sanambele: Role of Food Insects in Village Nutritional Health

Florence Dunkel Montana State University-Bozeman
The *Quiet Revolution* and our New Paradigm, Bottom-up Philosophy

Experiential, holistic, participatory, site-focus
THE QUIET REVOLUTION!
THANK YOU TO OUR SPONSOR:

USDA National Institute of Food and Agriculture (NIFA) Higher Education Challenge Grant Program
Montana State University-Bozeman

PSPP 465R Health, Poverty, Agriculture: Concepts and Action Research

BIOL 106CS Issues of Insects and Human Societies
Land Grant Universities:
Virginia Tech
University of California-Davis
University of California-Riverside
Montana State University
Non-Land Grant Service-Based, Private, Urban: University of St. Thomas St. Paul MN

Public, not service-based: University of Montana
Tribal College 1994 Land Grant:
Chief Dull Knife College
College of the Northern Cheyenne People
Underlying Philosophy of The Quiet Revolution

Part 1

Underlying Philosophy of The Quiet Revolution Part 2

- Easterly, William. 2006. *The white man’s burden: Why the West’s efforts to aid the rest have done so much ill and so little good.* Penguin Press.
Underlying Philosophy of The Quiet Revolution
Part 3

• Ba, Amadou Hampate. 1972. *Aspects of African civilization* (person, culture, religion.)
• Weist, Thomas. 2004. *History of the Northern Cheyenne*. Chief Dull Knife College. 2006. *We, the Northern Cheyenne*.
Plate 1. Although they have considerable knowledge of green, yellow, red, and blue, people in single, isolated disciplines are unable to manage gray (the “whole”) of which they have no knowledge. Management is not even focused on gray, as the arrows indicate. This single-discipline approach to management was generally recognized as a failure many years ago.
Plate 2. People in a multidisciplinary team are focusing on gray from their perspective, as arrows indicate, but still with no knowledge of gray. The lack of success arising from multidisciplinary management was attributed to poor communication owing to the jargon associated with the various disciplines, rather than a lack of knowledge.
Plate 3. To overcome communication problems, people trained in several disciplines form interdisciplinary teams that then focus their attention on gray, as the arrows indicate. Knowledge of gray is still lacking, however. The lack of success arising from the interdisciplinary approach to management has only recently been acknowledged.
Plate 4. We now take the perspective of the whole (gray), first of all by defining the limit of a “manageable” whole, then determining what that whole must become based on the needs of the people within it and the environment that must sustain their endeavors (the holistic goal). Now the people making decisions within the whole can look outwardly at all available knowledge to determine which best serves their needs and takes them toward the holistic goal.
WELCOME TO SANAMBELE
Traditional Bambara village in Mali
Location:
2 hours by car or motor bike from the capital city, Bamako
9 hours by public bus

Population:
1999 - 732 people
2005 – 1,000 people
2010 - 1,200 people
History

• **1999** IPM CRSP participatory IPM vegetable growing project for export

• **2005** Montana State University students / faculty / mentors from Mali national agricultural research organization conduct gender-based focus groups in 11 villages in region, including Sanambele

• **2005** Samambele identified holistic goals as a village: #1 malaria eradication, #2 hunger
Malaria History

• **2007-2008** villagers develop sustainable, village-based malaria IPM (eradication) plan with suggestions from PSPP 465R students/mentors

• **2009** first year no child dies from malaria and mosquitoes disappear from village in rainy season.

• **2010** Village leaders make plans to help neighbor village develop malaria IPM
“Hunger” History

• 2008 23% of young children, 0 to 36 month old with Kwashiorkor or in risk category
• 2008 Village women/village midwife develop recovery diet for children at risk
• 2008-2009 Montana State PSPP 465R students and mentors learn about diet and kwashiorkor
2008 Kwashiorkor History

Health Statistics of children ages 0-36 months in Sanambele, Mali

- 77% healthy
- 21% at risk
- 2% Kwashiorkor

*These cases recovered. No deaths due to Kwashiorkor in 2009
2009 Kwashiorkor history

- **March** Sanambele Women’s Association President initiates classes for moms to learn-to-read through nutrition lessons.

- **March** Women learns to recognize kwashiorkor and make intervention diet for at-risk children

- **Sept** women discourage children’s grasshopper hunting and eating due to pesticides in nearby cotton fields

- **Sept** students and mentors introduce brick wall concept of complete proteins
2010 Kwashiorkor History

• No deaths from Kwashiorkor

• Some children recovered from at-risk status
Understanding Kwashiorkor

Complete Proteins, Essential Amino Acids, and Protein-Energy Malnutrition
What Are Proteins?

• Class of nutrients required by all living things.
• Pivotal role in many life processes
  – Structural component of cells
  – Component of enzymes and hormones
  – Aid in transport of many chemical compounds within the body
• Constructed of “building blocks” called amino acids
Two Classes of Amino Acids

• Nonessential
  – Body can manufacture
  – Need not be present in the diet

• Essential
  – Body cannot manufacture in sufficient quantities
  – Must be present in the diet
  – Ratios important!

<table>
<thead>
<tr>
<th>Essential Amino Acids for Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine</td>
</tr>
<tr>
<td>Histidine</td>
</tr>
<tr>
<td>Isoleucine</td>
</tr>
<tr>
<td>Leucine</td>
</tr>
<tr>
<td>Lysine</td>
</tr>
<tr>
<td>Methionine</td>
</tr>
<tr>
<td>Phenylalanine</td>
</tr>
<tr>
<td>Threonine</td>
</tr>
<tr>
<td>Tryptophan</td>
</tr>
<tr>
<td>Valine</td>
</tr>
</tbody>
</table>
Complete Protein

• Contains all of the essential amino acids
  – Animal products
  – Some nuts
  – NOT MILLET
  – NOT SORGHUM
  – NOT CORN

(Cowpeas contain all essential amino acids, except tryptophane.)
Kwashiorkor

- Form of protein-energy malnutrition
- Results from diet sufficiently high in calories but low in high-quality protein
- Can occur in children of all ages
- Most commonly appears shortly after weaning
- **March 2009**: Farmers of Sanambele identify Kwashiorkor as a major problem facing their village
Consequences of Kwashiorkor

- Distended abdomen
- Edema in the hands, feet, and face
- Delayed mental and physical development
- Reddening of the hair
- Irritability
- Listlessness
- Loss of appetite
- Can be fatal!
In Sanambele:

Traditional Adult foods

*Traditional Children’s foods*
Nutritional Facts

Kwashiorkor (Diet is deficient in complete proteins: need meat, eggs, and dairy)
Can cause permanent damage

Malian Diet consists of:
millet, sorghum, rice, corn, tomatoes, carrots, peanuts, and cowpeas:
Incomplete source of essential proteins
Complementary / Complete Protein Sources

Cowpeas
peanuts
chicken and entrails
wild caught birds
wild caught fish
wild caught frogs
goat meat
goat milk
cow meat
cow milk
sheep meat
grasshoppers
termites
giant water bugs
Nutritional aspect

- Young children (5-10 years old) need ~1g protein/kg bodyweight/day → 19-34 grams protein

<table>
<thead>
<tr>
<th></th>
<th>Average Weight of insect</th>
<th>Protein content per 100 grams of weight</th>
<th>Protein content per insect (average)</th>
<th>Number of grasshoppers to be consumed to make up 10% of diet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 year old</td>
</tr>
<tr>
<td>male</td>
<td>0.313 grams</td>
<td>~20.6 grams</td>
<td>0.1376g</td>
<td>27</td>
</tr>
<tr>
<td>female</td>
<td>0.688 grams</td>
<td>~20.6 grams</td>
<td>0.07g</td>
<td>13</td>
</tr>
</tbody>
</table>

Compared to ~29 grams per 100 grams of lean beef
Grasshopper are supplemental snacks for young children

- *Oedaleus senegalensis*
- *Kraussaria angulifera*
Western Attitude

- Risk of pesticides should be assessed
- Risk of losing cultural richness
- Reassess holistic goals to identify current issues
Recommendations

• Listen
• Respect and recognize value in traditional wisdom
• Encourage holistic goal setting
• Be an example of ethnorelativism
Acknowledgements

• Women’s Association of Sanambele for their teachings, hospitality, and friendship

• Keriba Coulibaly, Abdoulaye Camara, Aissata Thera, Mali Agribusiness Center (IER) for cultural guidance

• PSPP 465R students Heather Taylor and Dana Fejes for their teaching and insights

• Husband, Robert Diggs, children and grandchildren for their patience
THANK YOU!
Questions?