Options for achieving optimal diets in resource-limiting settings

Follow the discussion at:
Our challenge

How do we deliver nutritionally optimal, ethical, appropriate, safe and sustainable diets in resource-limiting settings?
Outline

1. **Introduction** (Robyn Alders, USyd)
   - characteristics of resource-limiting settings and maternal and child nutrition
   - understanding options for and promoting dietary diversity in resource-limiting settings

2. **Animal-source food and maternal and child nutrition in resource-limiting settings**
   (Paula Dominguez-Salas and Julia de Bruyn)

3. **Village poultry, gender and maternal and child nutrition: findings and lessons from central Tanzania**
   (Julia de Bruyn)

4. **Dietary adequacy in resource-limiting areas of Nairobi and food safety aspects of ASF**
   (Delia Grace and Paula Dominguez-Salas)

5. **Approaches for assessing diets in resource-limiting settings** (Mieghan Bruce)

6. **Interactive session**

7. **Wrap up and finalising workshop statement**
My dual passions, commitment to family farming and a possible conflict of interest

Village chickens and their owners

Merino sheep and Australian farmers
1. Introduction and Understanding options for and promoting dietary diversity in resource-limiting settings
Resource-limiting settings

Geographical
- low rainfall areas
- inhospitable climate
- poor soil

Socio-economic
- low income
- inadequate access

Household
- inadequate access to information
- inadequate access to resources/assets
- inadequate decision-making power

Temporal
- low rainfall seasons
- natural disasters
Challenges for women in resource-limiting settings

Nutritional information for breastfeeding women

Environment where breastfeeding women live

Tanzanian Food and Nutrition Centre, 2014

Alders, 2014
Providing nutritious food across the seasons in agriculturally resource-limiting situations
Providing nutritious food across the seasons in agriculturally resource-limiting situations

Village chicken numbers – no ND* control

Cereal availability

Dry season

Wet season

Hunger period

* ND = Newcastle disease
# In utero dietary requirements

<table>
<thead>
<tr>
<th>Trimester</th>
<th>Protein</th>
<th>Micronutrients</th>
<th>Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>+++</td>
<td>+++</td>
<td>+</td>
</tr>
<tr>
<td>Second</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Third</td>
<td>+</td>
<td>+</td>
<td>+++</td>
</tr>
</tbody>
</table>

Women reluctant to disclose pregnancy during first trimester
Therefore: crucial to ensure good nutrition for women of reproductive age

(Kimboka 2014)
Providing nutritious food across the seasons in agriculturally resource-limiting situations

Village chicken numbers – no ND* control

Village chicken numbers – with ND* control

Cereal availability

Dry season  

Wet season

Hunger period

* ND = Newcastle disease
Family poultry is defined as small-scale poultry keeping by households using family labour and, wherever possible, locally available feed resources.

Family poultry employs one of three different production systems and may involve chickens, muscovy, pigeons, mallard ducks, Guinea fowl, quail, turkeys or geese.
Decision tools for family poultry development

• Chapter 1: Defining family poultry production systems and their contribution to livelihoods

• Available: http://www.fao.org/3/a-i3542e.pdf
Strengthening food and nutrition security through family poultry and crop integration in Tanzania and Zambia (Nkuku4U; FSC/2012/023)

Research aim

To reduce childhood undernutrition by analysing and testing opportunities to enhance the key role that women play in improving poultry and crop integration and efficiency to strengthen household nutrition.
Tanzania
Tanzania Veterinary Laboratory Agency
Tanzania Food and Nutrition Centre
Ministry of Agriculture, Food Security and Cooperatives
Sokoine University of Agriculture
Dar es Salaam University
Muhumbili University of Health and Allied Sciences

Zambia
Ministry of Fisheries and Livestock
Ministry of Health (Public Health)
Ministry of Community Development and Social Welfare
National Commission for Food and Nutrition
University of Zambia

International
Royal Veterinary College, London
One Health Economist
Veterinary Ecologist
Kyeema Foundation
Social Anthropologist
Veterinary Laboratory and Cold Chain Specialist

Australia
USyd School of Public Health
Nutritional Epidemiologist
Biostatistician

USyd Faculty of Agriculture and Environment
Post Harvest Specialist and Farming Systems

USyd Faculty of Veterinary Science
Vet Public Health Epidemiologist; Biometrician
Village Poultry Health and Food and Nutrition Security Specialist

Further details
http://sydney.edu.au/vetscience/research/Nkuku4U/
Project objectives

1. To assess the existing family poultry-crop **systems** and poultry **value chains**.

2. To **test appropriate interventions** for improving the integration and efficiency of family poultry/crop systems and poultry value chains.

3. To **assess the role of women and impact of improved family poultry-crop systems interventions** on childhood undernutrition.

4. To **support capacity building of and catalyse strategic long-term partnerships** between key institutions and individuals associated with family poultry, food security, and sustainable agriculture.
### Nkuku4U Dietary Diversity Tool

- Based on questionnaires used previously in Tanzania

<table>
<thead>
<tr>
<th>Green leafy vegetables</th>
<th>Cassava leaves</th>
<th>Bean leaves</th>
<th>Amaranthus</th>
<th>Pumpkin leaves</th>
<th>Spinach</th>
<th>Other (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>96</td>
</tr>
</tbody>
</table>

None ................................ 99

<table>
<thead>
<tr>
<th>Meat, fish and offal</th>
<th>Cow</th>
<th>Goat</th>
<th>Pig</th>
<th>Chicken</th>
<th>Duck</th>
<th>Guinea fowl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

Duck ................................ 5

Duck ................................ 7

| Other (specify) ..... 96       |                |            |             |             |          |               |
| None .......................... 99 |

Source: Excerpts from Maternal and Child Health and Nutrition Baseline Questionnaire
Initial dietary diversity tool used was not well-adapted to local conditions

Missed many non-cultivated foods of plant and animal origin

Credit: Robyn Alders, USyd
A Nutrition Sensitive Landscapes (NSL) approach considers:

- the diverse interactions and interconnectivity within a given landscape
- to optimize the multiple goals of food and nutrition security, sustainable use of natural resources and
- conservation of biodiversity, both for human health, as well as environmental health.

Source:

Credit: Brigitte Bagnol
Our current model

Secondary data → Biodiversity → Dietary diversity → Optimal dietary options
Secondary data analysis

- Agro-ecological data (soil analysis, rainfall, etc.)
- Socio-economic data (main production and trade, constraints, etc.)
- Gender issues (Access, control and benefits over resources, etc.)
- Linguistic group specificities
- Health and nutrition data (malnutrition, fertility rate, age at first birth, etc.)
- List of principal stakeholders

Mapping dietary Selenium availability in Africa

Source: http://www.nature.com/articles/srep01425?message-global=remove
Inventory of non-cultivated food

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Tools and instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the different seasons</td>
<td>Focus group discussion (FGD)</td>
</tr>
<tr>
<td>List non-domesticated and domesticated animals for each season</td>
<td>FGD and key informants (KI): Check lists</td>
</tr>
<tr>
<td>List non-cultivated and cultivated plants and fruits for each season</td>
<td>FGD and KI: Check lists</td>
</tr>
</tbody>
</table>

Example of possible results: Frequency of non-cultivated food item reported in Bundabunda Ward for all three seasons

Further details in ANH conference poster: *Wild foods in Bundabunda Ward Zambia: An assessment of diversity and potential contribution to food and nutrition security*
Dietary diversity

Objectives

- Assess household Dietary Diversity
- Evaluate relative proportion of cultivated and non-cultivated food by gender, age and reproductive status

Evaluate the quantity of each food in a daily diet

Tools and instruments

- Questionnaire: 24 hour recall (adapted from Kennedy, Ballard and Dop. 2013)
- Focus Group Discussion

Example: Dietary diversity registered in Bundabunda Ward at the end of the dry season in 2015

<table>
<thead>
<tr>
<th>≤ 3 food groups</th>
<th>4 and 5 food groups</th>
<th>≥ 6 food groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>26%</td>
<td>52%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Source: Elasto Zulu University of Zambia
## Optimal dietary options

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Tools and instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assess quantity of food consumed by age, gender and reproductive stage</td>
<td>Weighing of food consumed</td>
</tr>
<tr>
<td>Identify food composition</td>
<td>Food composition data (participatory expert consultation for estimate composition when necessary)</td>
</tr>
<tr>
<td>Develop culturally acceptable diet by age, gender and reproductive stage per each season</td>
<td>Preparation with communities members of some suggested combination of food and test for palatability and acceptability</td>
</tr>
</tbody>
</table>

Further details in ANH conference poster: **Nutrition knowledge, attitudes and dietary intake of women of reproductive age in Bundabunda Ward, Zambia**

Credit: Allison Grech, University of Sydney
# Examples of tools used

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Quantify food consumed</td>
<td>Different spoon size</td>
</tr>
<tr>
<td>Open up discussion around non-cultivated food</td>
<td>Laminated images of cultivated and non-cultivated food available during the season</td>
</tr>
</tbody>
</table>
Discussion themes
• Dietary adequacy in urban and peri-urban environments
• Dietary adequacy in rural environments
• Resource-limited household members / Resource allocation within households
• Dietary diversity, biodiversity and sustainable diets

Discussion questions
• What are examples of projects/programs currently working in on these themes?
• What lessons have we learnt from research in these themes to date?
• Can you provide examples of how gender has been successfully integrated as a cross-cutting theme?
• Can you provide examples of how food safety has been successfully integrated as a cross-cutting theme?
• What methods have you used to identify linkages / pathways / systems in these settings?

Moving forward
• Resource-limited research
  o Time to understand research setting (ecological, social, economic)
  o Willingness to share limitations and challenges faced
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7. Wrap up and finalising workshop statement
Draft workshop statement


“There is no single, perfect diet that fits everyone but rather a range of dietary options depending on locally available food, biological (age, gender, health and reproductive status) and socio-cultural factors.

In many resource-limiting environments, food availability is influenced by seasonal farming and production patterns, livestock and land ownership, non-cultivated plants and non-domesticated animals, socioeconomic circumstances, tradition and the presence of markets for affordable food. In terms of efficiency, the bioavailability and density of key macro- and micro-nutrients vary across different foods, by season and with processing, and trade-offs and synergies between nutritional security, food safety, livelihoods, women’s empowerment and ecosystem services should be considered. Animal-source foods, even in small quantities, offer the particular advantage of increasing the adequacy of plant-based diets.

Strong and functional linkages between nutritional programs, nutrition-sensitive agriculture and value-chains at local and national levels, with a strong focus on sustainable systems, process and policy, can contribute to nutritionally optimal, safe, appropriate, sustainable and ethical diets in resource-limiting settings.

To support optimal use of limited research resources, the open sharing of de-identified data bases together with information on data collection protocols, assumptions employed and strengths and weakness of data bases is recommended.”
Pre-congress workshop: Secure, safe, sustainable food systems: Safe today, optimal for the future
30 Nov-2 Dec 2016
http://oheh2016.org/pre-congress-workshops/
Bibliography (I)

Publications


Bibliography (II)

Conference abstracts


Weblogs and social media


Animal-source food (ASF) consumption across Africa remains low; improved animal health can help to increase access to safe, affordable ASF.

Reliable cold chains are essential to ensure effective vaccination.

Has received significant attention by our human medicine colleagues.
