ENHANCING PRODUCTION AND CONSUMPTION OF INDEGINOUS VEGETABLES FOR BETTER NUTRITION AND HEALTH THROUGH NUTRITION EDUCATION AND COMMUNICATION: LESSONS FROM RECIPE FOR SUCCESS

Joyce Kinabo
Sokoine University of Agriculture
Department of Food Science and Technology
PO Box 3006 Morogoro Tanzania
Introduction

- Sub-Saharan Africa bears a heavy burden of nutrition-related health problems.
- Basically due to:
  - Insufficient intake of micro-nutrients,
  - Lack of sufficient supply of energy and proteins
  - Consumption of cheap fatty and refined starchy foods.
  - Low consumption of fruits and vegetables,
  - Diseases such as malaria and complications resulting from HIV/Aids.
Introduction...

- Close to 1,000 species of vegetables and twice as many local fruits (Maundu et al., 2009) exist in Africa but most of which are under-utilized,
  - Why:
    - Viewed as poor-man’s foods.
    - Thus, stigma has forced many communities to grow and also purchase exotic foods whose consumption they cannot sustain due to economic and ecological implications.
    - Nevertheless, Nutritionally some of these local vegetables have shown high value for the more important nutrients.
    - In addition,
      - The indigenous vegetables are locally available,
      - Knowledge of use often accessible and
      - Generally require only minimal inputs.
      - Have been shown to have good market value.
Introduction

- Vegetables play an important role in dietary micronutrient intake and for facilitating consumption of staple cereals, tubers or roots.
- Indigenous vegetables make significant contribution to micronutrient intake.
### Vegetable diversity

<table>
<thead>
<tr>
<th>Country</th>
<th>Species</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanzania</td>
<td>105</td>
<td>Ruffo et.al 2002</td>
</tr>
<tr>
<td></td>
<td>74 (in a small district)</td>
<td>Kending et. al (2007)</td>
</tr>
<tr>
<td>Kenya</td>
<td>210</td>
<td>African vegetable project (2001 -05)</td>
</tr>
<tr>
<td>Benin</td>
<td>100</td>
<td>Darwin – initiative project</td>
</tr>
<tr>
<td>Africa</td>
<td>&gt;1000</td>
<td></td>
</tr>
</tbody>
</table>
## Mineral Composition of Few Selected Vegetables

<table>
<thead>
<tr>
<th>Vegetables</th>
<th>Zn</th>
<th>Mn</th>
<th>Ca</th>
<th>Fe</th>
<th>Mg</th>
<th>Cu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likolowoga</td>
<td>4.01</td>
<td>5.55</td>
<td>1103.8</td>
<td>24.7</td>
<td>278.5</td>
<td>0.85</td>
</tr>
<tr>
<td>Figiri</td>
<td>5.69</td>
<td>3.54</td>
<td>373.7</td>
<td>19.2</td>
<td>-</td>
<td>1.41</td>
</tr>
<tr>
<td>Pumpkin leaves</td>
<td>3.42</td>
<td>3.21</td>
<td>741.95</td>
<td>14.4</td>
<td>296.3</td>
<td>0.97</td>
</tr>
<tr>
<td>Cassava leaves</td>
<td>6.92</td>
<td>7.41</td>
<td>1081.2</td>
<td>12.6</td>
<td>287.5</td>
<td>0.80</td>
</tr>
<tr>
<td>Nyadudwe</td>
<td>4.08</td>
<td>3.63</td>
<td>1624.2</td>
<td>13.3</td>
<td>356.5</td>
<td>0.61</td>
</tr>
<tr>
<td>Tembele Bangi</td>
<td>3.44</td>
<td>13.39</td>
<td>914.1</td>
<td>24.2</td>
<td>382.8</td>
<td>1.88</td>
</tr>
<tr>
<td>Mkalifya</td>
<td>5.19</td>
<td>3.15</td>
<td>327.5</td>
<td>42.5</td>
<td>353.0</td>
<td>1.53</td>
</tr>
<tr>
<td>Lifweni (amaranth)</td>
<td>2.55</td>
<td>6.86</td>
<td>1895.5</td>
<td>42.2</td>
<td>921.5</td>
<td>0.78</td>
</tr>
<tr>
<td>Tembele viazi vyekundu (s. Potato leaves)</td>
<td>0.20</td>
<td>0.41</td>
<td>65.4</td>
<td>1.4</td>
<td>20.87</td>
<td>0.08</td>
</tr>
<tr>
<td>Nyamulula</td>
<td>5.81</td>
<td>4.38</td>
<td>453.0</td>
<td>17.4</td>
<td>387.0</td>
<td>1.42</td>
</tr>
</tbody>
</table>
Gaps

Despite existence of a wide variety of vegetables with high nutrient content

- Making use of research data – particularly agronomic, nutritional and health-related data – to support promotion and production work.

- Improving seed systems for local vegetables.

- Improving/developing value chains and empowering local community groups to be responsible for the value chain.
Gaps

• Making the knowledge and skills of preparation, value adding and utilization widely available in participating communities through forums e.g. cooking demonstrations.

• Promotion to remove stigma and improve consumption thereby creating demand for the vegetables.
Project Background

• Challenges:
  – Lack of appropriate communication is one of the hurdles in creating impact from research
  – Limited scientific knowledge of production practices and insufficient availability of seed of good quality prevent wider uptake of traditional vegetable production and consumption.
Goal

• To increase the nutritional status of underprivileged groups in Benin, Kenya and Tanzania through better production of and access to traditional fruits and vegetables.
Objectives

• To enhance access to improved knowledge on production and processing of indigenous vegetables and fruits,

• To Provide targeted and relevant information about nutritious foods and the role of indigenous fruits and vegetables in health, and

• To Assist in the marketing of indigenous fruits and vegetables and their products.
Specific Objectives

• To strengthen the capacity of community groups to organize themselves into business and production units through “Health Clubs”.

• To evaluate the effects of soils, climate and farmer practices on production and nutrient content of indigenous vegetables and fruits.

• To facilitate the availability of sufficient quantity of quality seed for valuable indigenous vegetables and fruits.

• To produce new knowledge of the effect of processing on nutrient components/palatability of indigenous vegetables and fruits.

• To put into place a communications strategy to address various issues related to the effect of indigenous vegetables and fruits on nutrition and health.
Approach

• This study was carried out in three African countries:
  - Benin
  - Kenya
  - Tanzania
Approach

- Components of the study:
  - Health Clubs
  - Production studies
  - Seed availability
  - Nutrition and health studies
  - Communication strategy
Tanzania Component – Nutrition and Health Studies

- Promotion of vegetable production by empowering small ‘commercial’ vegetable growers in urban areas
- Promotion of vegetable consumption by empowering the food vendors
- Analyzing and documenting the nutrient content of different vegetable dishes commonly prepared in the country (Fe, Zn, Se, Beta-Carotene)
Commercial Vegetable Growers in Urban Areas

- Initially three sites were identified:
  - 1 in Morogoro,
  - 1 in Mlandizi - Coast region
  - 1 in DSM

- Needs assessment and situation analysis were conducted:
  - Vegetable producers were highly fragmented
  - Majority of them don’t own the land
  - There were many conflicting interests among themselves
  - DSM and Mlandizi sites were extremely vulnerable to weather conditions - eventually dropped out.
Process of Empowering Vegetable Growers

• Sensitization meetings for the growers to identify needs and problems; what can be done to solve them.
• The identified need was to form a cooperative group so as to have ‘bigger voice’
Empowering Vegetable Growers

- Project provided training on group formation
- Facilitated writing of a constitution for the cooperative group (with involvement of the Local Government in the area)
- The **Nguvu Kazi Vegetable Growers** Cooperative Group was formed and launched
- 27 founding members registered: 20 Males and 7 Females
- The group was supported with ‘seed money’ to start a revolving fund for members to improve their working capital (tools, seeds, plot rent).
Empowering Street/Market Site Food Vendors

- Two places were identified in DSM (Magomeni Market and Tandale Market)
- Needs assessment and situation analysis were conducted:
  - Vegetable Amaranth and Chinese cabbage were the most used vegetables
  - However, customers were fond of other indigenous vegetables such as cassava leaves, night shade, cowpea leaves, etc but could not be supplied.
  - The operators were already organized in cooperatives in the two market places
  - Knowledge on ‘nutrition best practices’ of handling vegetables was highly lacking
Empowering Operators of Street/Market Site Food Vendors

• Trained 55 Females and 5 Males on ‘nutrition best practices’ for handling vegetables to ensure maximum nutrient retention and enhancing palatability

• Followed up the operators and their customers in collaboration with Local Government in the area
## Nutrient Content of Vegetable Dishes

<table>
<thead>
<tr>
<th>Nutrient content (g/100g)</th>
<th>N</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tanzania</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>32</td>
<td>0.74</td>
<td>24.94</td>
<td>10.52</td>
<td>7.00</td>
</tr>
<tr>
<td>Zinc</td>
<td>32</td>
<td>0.61</td>
<td>4.07</td>
<td>2.16</td>
<td>0.95</td>
</tr>
<tr>
<td>Selenium</td>
<td>32</td>
<td>0.37</td>
<td>1.15</td>
<td>0.70</td>
<td>0.21</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>32</td>
<td>0.47</td>
<td>72.99</td>
<td>30.02</td>
<td>19.97</td>
</tr>
<tr>
<td><strong>Kenya</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>20</td>
<td>3.34</td>
<td>22.04</td>
<td>11.68</td>
<td>6.33</td>
</tr>
<tr>
<td>Zinc</td>
<td>20</td>
<td>0.77</td>
<td>3.34</td>
<td>1.97</td>
<td>0.68</td>
</tr>
<tr>
<td>Selenium</td>
<td>20</td>
<td>0.44</td>
<td>1.38</td>
<td>0.91</td>
<td>0.22</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>19</td>
<td>3.41</td>
<td>92.51</td>
<td>33.37</td>
<td>21.73</td>
</tr>
</tbody>
</table>
Vegetable Growers: Challenges

- Lack of entrepreneurial self-driven attitudes among the members
- Conflicting interests among stakeholders
  - Access to land plots and market outlets
  - Benefits of possessing key production tools
- Vulnerability to weather-related hazards (impact of Climate Change??)
- Low Government recognition in terms of input supports (e.g. subsidies); market information; statistical data on contribution to food security and economy
- Poor marketing infrastructure
Operators of Street/Market Site Food Vendors: Challenges

- Lack of entrepreneurship self-driven attitudes among the members
- High rate of illiteracy (not being able to read or write)
- Lack of ‘proper’ working facilities
- Frequent conflicts with LG authorities
- Seasonality of prices,
- Poor storage facilities,
- Limited knowledge on vegetable recipes
Nutrient Content of Vegetable Dishes: Challenges

- Lack of equipment for analyzing nutrients in foods
- Lack of ‘standard’ recipes
  - different preparation procedures
  - different ratios of ingredients for similar dishes
  - different ingredients used for similar dishes
Some promising outcomes

- ‘Nguvu Kazi’ Group of Vegetable Growers has been able to acquire 80 acres of land outside Morogoro Town for diversifying production. They need information on better practices for high nutrient quality products.

- Operators of the street/market sites eating places are actively seeking information on how to improve the quality and palatability of dishes they sell so as to impress their customers.
Communications Strategy (CS):

- **Components of the CS:**
  - Who are the relevant stakeholder groups?
  - What is to be communicated?
  - How is the message communicated?
  - When is it communicated?
  - Relevance of the project to the different stakeholders (High, Medium, or Low)
Communications Strategy:

- Relevant stakeholder groups:
  - General public
  - Operators of popular eating places
  - Vegetable growers
  - Government & National Health Systems
  - Local Support Institutions
  - Entrepreneurs
<table>
<thead>
<tr>
<th>General public</th>
<th>Popular eating places</th>
<th>Government / National Health System</th>
<th>Vegetable growers for market</th>
<th>Local Support Institutions</th>
<th>Entrepreneurs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of IFV to nutrition &amp; health</td>
<td>Importance of recipes with IFV for customers</td>
<td>Reduced morbidity &amp; mortality</td>
<td>Importance of being innovative in the production</td>
<td>Complementarities of project to their efforts</td>
<td>Income opportunity</td>
</tr>
<tr>
<td>Processing methods</td>
<td>Best ways of handling and cooking vegetables for enhancement of nutrients and palatability</td>
<td>Effect on productivity</td>
<td>National identity / national heritage</td>
<td>Concerns for food safety</td>
<td>Nutrition contributes to other objectives (such as AIDS mitigation, health, education...)</td>
</tr>
<tr>
<td>Production</td>
<td>Nutritive values of IV</td>
<td>Sustainable way of alleviating malnutrition</td>
<td>Opporuntity to change their lives (poverty alleviation)</td>
<td>Need to network</td>
<td></td>
</tr>
<tr>
<td>Income generation</td>
<td>Imports of conservation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance of conservation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lessons for ENACT

• Focus on household level or women for nutrition education has not brought up significant improvement in nutrition situation in many countries in Africa.

• Realisation of the heterogeneity of groups that need nutrition education and communication. For example in the vegetable sector: HHs, Vendors, producers, consumers, policy makers and enforcers, etc.

• Consumption patterns have changed and increasingly people opt to eat out. Thus, home food preparation is continually declining.
Lessons for ENACT

- Preparation of vegetables is not done properly hence reduces the potential for improving nutrition status of consumers
- The amount consumed is too small to make meaningful contribution to micronutrient intake
- Limited inclusion of vegetables in the fast food systems
- Limited access to ingredients that improve palatability and availability of nutrients (cooking oil)
Lessons for ENACT

• Limited understanding of the Safety of vegetables due to use of unpermitted pesticides and fertilisers in vegetable production
• Conflicts between vegetable growers and urban authorities
• Awareness of urban authorities on the contribution of urban vegetable growers to adequate and balanced diets
• Inclusion of vegetable production data on national statistics at all levels
Conclusion

Stakeholders in the vegetable sector are not uniform. Therefore education and communication strategies should be specific for the various categories of stakeholders.
Thanks For Listening