Tapping the nutritional power of vegetables

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DG World Vegetable Center (WorldVeg)
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Nutritional power

• Diversity of vegetables
• Rural consumers
• Urban consumers
Vegetable production in Asia: big business

Source: FAO, 2017
Traditional vegetables

African eggplant

Ethiopian mustard

Amaranth

Jute mallow

Okra

Leafy Roselle

African nightshade
## Traditional vegetables: robust and rich in nutrients

### Micronutrient content of common and traditional vegetables

<table>
<thead>
<tr>
<th>Micronutrient</th>
<th>Cabbage</th>
<th>Moringa</th>
<th>Amaranth</th>
<th>Aibika</th>
<th>Sweet potato leaf</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-Carotene, mg</td>
<td>0.00</td>
<td>15.28</td>
<td>9.23</td>
<td>5.11</td>
<td>6.82</td>
</tr>
<tr>
<td>Vit C, mg</td>
<td>22</td>
<td>459</td>
<td>113</td>
<td>82</td>
<td>81</td>
</tr>
<tr>
<td>Vit E, mg</td>
<td>0.05</td>
<td>25.25</td>
<td>3.44</td>
<td>4.51</td>
<td>4.69</td>
</tr>
<tr>
<td>Iron, mg</td>
<td>0.30</td>
<td>10.09</td>
<td>5.54</td>
<td>1.40</td>
<td>1.88</td>
</tr>
<tr>
<td>Folates, µg</td>
<td>ND</td>
<td>93</td>
<td>78</td>
<td>177</td>
<td>39</td>
</tr>
<tr>
<td>Antioxidant activity, TE</td>
<td>496</td>
<td>2858</td>
<td>394</td>
<td>560</td>
<td>870</td>
</tr>
</tbody>
</table>

Source: WorldVeg Nutrition Lab
African Nightshade
Amaranth
Ethiopian Mustard
Tomatoes
Maize

- **Fertilizer Cost / Ha**
- **Insecticide Cost / Ha**
- **Herbicides Cost / Ha**
- **Fungicides Cost / Ha**
- **Labor Cost / Ha**
- **Total Cost / Ha**
- **Total Revue/ Ha**
- **Gross Margin**
The world’s largest collection of vegetable germplasm: World Vegetable Center Genebank

60,000 accessions; only 5% traditional vegetables
Nutritional power

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Consumption patterns of different income groups in rural and urban areas in Africa

Impact Pathway

Support systems

- Seed supplies
- Community support

Training in garden production
- Adoption of household gardens
- Increased FV production
- Increased FV consumption
- Increased micronutrient intake
- Increased micronutrient absorption
- Improved nutritional status

Training in nutrition & health
- Stronger motivation
- Stronger preferences
- Better methods
- Lower disease
Household Gardens – NW Cambodia 2016/17
Exploratory analysis - income calculation

Value of vegetables sold and consumed over an average 30 day period (KHR)

- KHR 92,055/month ~ US $23.00 better off
- KHR 18,702/month ~ US $4.67 from sales
- KHR 73,353/month ~ US $18.34 saved
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Tackling malnutrition through urban gardens in slums?

Proven household garden technologies in rural areas may be adapted to urban slum settings, e.g.:

- Sack gardens, container gardens (require less land and water per unit yield)
- Raised bed gardens, community (group) gardens (rotating scare labor)
- With or without low cost drip irrigation (USD 20 per set)
Youth vegetable business hubs in East Africa: linking with high end markets

- Link young farmers with markets – build trust
- Improve availability of high quality seeds
- Improve young farmer vegetable production skills
- Increase youth’s access to finance, inputs and markets
- Improve collaboration among young farmers
Packhouse Operations (example from Cambodia)

- Simple packhouse facility with ‘tuktukbot’ for direct marketing of Khum Khnart Samakey Roung Rouerng Agricultural Cooperative (KKSRRAC), Khnart, Pourk, Siem Reap, linking farms (55 members) and markets and as a hub for technical and business development services to harmonize production and marketing.
Impact of training in off-season tomato production on income and pesticide use
Bangladesh, 2014

<table>
<thead>
<tr>
<th>Outcome indicator</th>
<th>Average treatment effect</th>
<th>Significance</th>
<th>% increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total income (USD/capita)</td>
<td>85.9</td>
<td>p&lt;0.05</td>
<td>50.5</td>
</tr>
<tr>
<td>Pesticide use (kg/ha)</td>
<td>2.0</td>
<td>p&lt;0.05</td>
<td>58.4</td>
</tr>
</tbody>
</table>

Notes: Based on propensity score matching, n=245 (94 trained, 151 control).
Evaluation conducted 2 years after the training.

IPM can reduce pesticide use, but farmers have often no access and no incentive.
Amaranth (red roots) and choko tips (rolled in leaves) sold at a local market in Lae 2018

Photo Courtesy: Maarten van Zonneveld - WorldVeg