AVRDC – The World Vegetable Center

Vegetables are essential for HEALTH

Research builds on GENETIC DIVERSITY

Vegetable production is an engine for ECONOMIC GROWTH and HIGHER INCOMES
<table>
<thead>
<tr>
<th>Deficiency in</th>
<th>= HUNGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>calories + protein</td>
<td>925 million undernourished (2010)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Deficiency in</th>
<th>= MICRO-NUTRIENT DEFICIENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>vitamins &amp; minerals</td>
<td>2 – 3.5 billion malnourished</td>
</tr>
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<table>
<thead>
<tr>
<th>Excess of</th>
<th>= OVERCONSUMPTION</th>
</tr>
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<tbody>
<tr>
<td>calories</td>
<td>≥ 1.1 billion overweight</td>
</tr>
</tbody>
</table>

FAO, 2010

Imbalanced diets: Lack of micronutrients – “Hidden Hunger”
Research AND Development

Four global themes

Germplasm
- Germplasm conservation, evaluation and gene discovery

Breeding
- Genetic enhancement, varietal development, selection of indigenous lines, seed production

Production
- Safe and sustainable vegetable production systems

Consumption
- Postharvest management and market opportunities; nutritional security, diet diversification and human health

Headquarters
Regional offices
Project offices
Solanaceae: Tomato, Pepper, Eggplant
Bulb Alliums: Onion, Garlic, Shallot
Legumes: Mungbean, Vegetable soybean

Cucurbita: Cucumber, Pumpkin
Crucifers: Pak Choi, Broccoli

AVRDC Genebank: The world’s largest public-sector collection of vegetable germplasm.

Distribute 6-10,000 accessions & breeding materials annually worldwide:
• NARES
• universities
• private sector
• NGOs

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Indigenous vegetables

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Indigenous vegetables
Crop and food diversity for a balanced diet and better human health

<table>
<thead>
<tr>
<th>Ranges of over 100 different vegetable species</th>
<th>Global vegetables</th>
<th>Indigenous vegetables</th>
<th>Cereals*)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tomato (Solanum lycopersicum)</td>
<td>Moringa (Moringa oleifera)</td>
<td>Moringa (Moringa oleifera)</td>
</tr>
<tr>
<td>B-carotene (mg)</td>
<td>0.0 – 22</td>
<td>0.40</td>
<td>0.00</td>
</tr>
<tr>
<td>Vitamin C (mg)</td>
<td>1.1 – 353</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Vitamin E (mg)</td>
<td>0.0 – 71</td>
<td>1.16</td>
<td>0.05</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>0.2 – 26</td>
<td>0.54</td>
<td>0.30</td>
</tr>
<tr>
<td>Folicates (µg)</td>
<td>2.8 – 175</td>
<td>5</td>
<td>ND</td>
</tr>
<tr>
<td>Antioxidant activity, µmol TE</td>
<td>0.6 – 82,000</td>
<td>323</td>
<td>496</td>
</tr>
</tbody>
</table>

Data source: AVRDC – The World Vegetable Center’s nutritional laboratory, except for *) USDA 2009 and a) Miller et al. 2000
How AVRDC adds value...

Germplasm available worldwide

- Disease Resistance
- Insect Resistance
- Nutrition
- Abiotic Stress Tolerance
- Yield
- Quality

Germplasm enhancement

- AVRDC Collection
- Genetic stocks
- Germplasm from other genebanks

Breeding pipeline

- Population Development
- Gene Introgression
- Genetic Mapping
- Marker Development

Farmer participation

- Participatory evaluation

Adaptable technologies

- Public-private partnerships

Improved varieties

- Recipe development
- Home gardens
- Nutritional analysis

Increase consumption

- Field days
- Training and workshops

IMPROVED NUTRITION and INCOMES
With collaborators, we can...

• Share germplasm and research
• Address climate change

• Alleviate poverty and malnutrition

• Conserve biodiversity

• Improve seed systems
• Increase production safely

• Foster healthier lifestyles
• Promote sustainable land/water use