Agrobiodiversity for Healthier Diets and Better Nutrition
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Outline

1. What is agrobiodiversity and how can it be used to improve nutrition?
2. What are the issues that motivate our research?
3. Examples of our research
   a. Vitamin A and banana in East Africa
   b. African Leafy Vegetables in Kenya
   c. Minor Millets in India
   d. Consumer awareness in Zambia, Brazil and Vietnam
Agricultural Biodiversity

- **Ecosystem level**
- **Species level**
- **Genetic level**

**Provide**

**Support**

Agricultural biodiversity at different levels

- **Food**
  - Fibre
  - Fuel

**Ecosystems**

- **Air**
- **Water**
- **Soil**
- **Plants**
- **Animals**
- **Microbes**

Agricultural biodiversity includes all components of biological diversity that constitute the agricultural ecosystem.
Bioversity International

Agricultural biodiversity nourishes people and sustains the planet

Our Mission:

Deliver scientific evidence, management practices and policy options to use and safeguard agricultural biodiversity to attain sustainable global food and nutrition security
Challenge: Shrinking agricultural biodiversity

- **250,000** Globally identified plant species
- **7,000** Number of crops used for food by humans throughout history
- **3** Rice, maize, and wheat currently provide >50% of the world’s calories from plants
- **12** Crops that together with 5 animal species provide 75% of the world’s food today

(Data source: FAO, 1997)
Challenge: Nutritional Trilemma

Overweight or obese people increase since ‘80s

Today

2.1 billion people

0.875 billion people

805 million people are food insecure

GLOBAL MALNUTRITION

2 billion people suffer from micronutrient deficiencies

Vitamin A, Iron Fe, Zinc Zn, Iodine I
Challenge: Dominance of major crops

Wheat, maize, rice, soybean cultivated on 50% of global agricultural area
Poor Diets Now World’s Number One Health Risk

**FIGURE 1: Six of the top 11 risk factors driving the global burden of disease are related to diet**

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Disease risk factors linked to diet</th>
<th>Disease risk factors not linked to diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary risks</td>
<td></td>
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<td>High systolic blood pressure</td>
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<td>Child and maternal malnutrition</td>
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<td>Tobacco smoke</td>
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<tr>
<td>Air pollution</td>
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<tr>
<td>High body mass index</td>
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<td>Alcohol and drug use</td>
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<td>High fasting plasma glucose</td>
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<tr>
<td>Unsafe water, sanitation and handwashing</td>
<td></td>
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<tr>
<td>Unsafe sex</td>
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<tr>
<td>High total cholesterol</td>
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</tbody>
</table>

Global all-age disability-adjusted life years (in thousands, 2013)

Source: Global Burden of Disease Study 2013 Collaborators (2015), Figure 5
Note: The graph shows global disability-adjusted life years (DALYs) attributed to level 2 risk factors in 2013 for both sexes combined.
Diets around the globe look like this

**India**
This example of a child’s meal in India includes wheat, eggplant, and potato.

**Kenya**
This example of a child’s meal in Kenya includes corn flour and cabbage.

**Senegal**
This example of a child’s meal in Senegal includes cassava and milk.

**Guatemala**
This example of a child’s meal in Guatemala includes corn flour, black beans, and greens.
But diets should look like this

Brazil Food Based Dietary Guidelines, 2014. Ministry of Health, Brazil
Agrobiodiversity for Healthier Diets and Better Nutrition
Putting diverse nutritious foods back in the market and on the plate

Through:

• Generate evidence

• Integrate biodiversity into food systems

• Stimulate enabling policy environment

• Increase consumer awareness and demand
Vitamin A Banana in East Africa

>1000 varieties of bananas around world with different levels of nutrients, including vitamin A

In Eastern Africa, where we are working, banana is staple food - yet high levels of Vitamin A deficiency

5 cultivars with HIGH potential have been identified for mainstreaming in East Africa

Carotenoid level:
Trace

Up to 10,633 mcg/100 g (701 RAE/100g)

Orange-fleshed Fe’i bananas from the Pacific are rich in vitamin A precursors.
Credit: Biodiversity International/L. Englberger
Progress on Vitamin A Banana

- 5 cultivars selected by farmers (Ekesa et al, 2017)
- Content and retention of provitamin a carotenoids during ripening (Ekesa et al, 2015)
- >14000 plantlets distributed in Burundi and DRC
- >11,000 households directly reached with information on utilization of VAB in the diet through <300 TOTs
- Efficacy trial being planned
African leafy vegetables in Kenya Food System

Nutritious traditional African leafy vegetables disappearing from farmers’ field and people’s menus

Multi-year initiative in Kenya with partners:

- 12 nutritious species introduced into formal market
- 450 farmers (mainly women) trained on cultivation
- Increased income, increased dietary diversity & economic empowerment of women (Gotor et al., 2010)
Transforming the Value Chain for Minor Millets

Packaging, branding, building SHGs for entrepreneurial activities, empowering women - indigenous people and vulnerable groups

**finger millet dehusking small mill**

Increased household consumption of nutritious food

**From several hrs of pounding for de-husking grains to just 5 min!!**

Padulosi et al., 2015
Enabling environment for millets in India

Nutritious & drought resistant millets once part of traditional diets

Working with partners for 15 years to promote millet use resulting in:

- 2013 India’s food security act adds millets into public distribution system
- Millets on menu in restaurants, sold on streets
- Inclusion of millets in school lunches in 12 districts in Central & Southern India
Raising awareness of local nutritious foods in Zambia

- Nutritious recipes displayed and documented
- Nutrition clubs participated (mostly women) trained on cultivation
- Increased awareness, local pride and motivation to produce and consume local, nutrient-rich foods

Photos: Foods on display at the Food Fair in Barotse. Credit: Bioversity International/E. Hermanowicz
Stimulate Consumer Demand

BARU

ARATICUM

NOMES COMUNS: Araticum, bruto, cabeça-de-negro, marolo, pinha do cerrado, panã, araticum panã, araticum do cerrado, cabeça-de-pinha, araticum liso, araticum cortiça.

NOME CIENTÍFICO: Annona crassiflora Mart.

Hãy tôi câu lạc bộ đa dạng dinh dưỡng để chia sẻ kinh nghiệm của bạn và cùng vui học hỏi!
Concluding remarks

- **Biodiversity** is essential for sustainable food systems and healthy, nutrient rich diets

- **Biodiversity** is key to achievement of the SDGs and reshaping our global food system - ‘*Business as usual*’ no longer an option

- **Biodiversity** is a ‘win-win’ scenario – improves diet quality and diversity but also landscape resilience and improved livelihoods (women),

- **Biodiversity** stewardship and sustainable use requires that Governments create an enabling environment and that consumers are integrated as key drivers of food system change
Thank you

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