Sustainability of World Nutrition

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Where we are today (1)

World Population is increasing. Today we have 7 billion people. In many countries increasing % of elderly

Environment is deteriorating. Erosion. Climate change is continuing (in 2010 increase of CO₂ emission of 6%)

Limited natural resources. Water is becoming scare and ground water is becoming salivated in some regions. Energy is limited and oil and gas reserves are finishing

Agricultural production has to increase but land is limited and can only be expanded through e.g. deforestation. Loss of soil fertility because of pesticide use (esp. where pesticide-resistant GMO foods are grown such as soy). 70% of water is used in agriculture – increase difficult. Climate change threatens agriculture

Where we are today (2)

Food Waste: 30% of the produced food is lost or wasted (1.3 billion tons per year) = waste of inputs and unnecessary increase of CO₂

Subsidies are rarely on fruits and vegetables but often on soy, wheat, sugar, soya oil (in a olive oil producing country) = enhances wrong food choice

Fat Tax to lower fat intake since 2011 in Denmark

Where we are today (3)

Double burden of malnutrition.

Obesity endemic has reached developing countries. Non-communicable diseases are increasing worldwide. Undernutrition and micronutrient deficiencies are persisting

Medicalised approach is favored instead of food-based for nutrition: fortification and supplementation

Simplification of diets and shift towards westernized diets

Increased consumption of animal products in e.g. China and India

Food security is threatened in many countries, worsened through increased food prices and financial crisis

Solutions are needed in all sectors
Definition of Sustainable Diets

Sustainable Diets are those diets with low environmental impacts which contribute to food and nutrition security and to healthy life for present and future generations. Sustainable diets are protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; nutritionally adequate, safe and healthy; while optimizing natural and human resources.

3. Decision-makers should give priority to and promote sustainable diet concepts in policies and programmes in the agriculture, food, environment, trade, education and health sectors. Nutrition should be given more emphasis by plant and animal breeders and research on nutrient content of food biodiversity should be encouraged. Food composition data should be compiled by FAO in the INFOODS databases and by regional and national institutions.

4. New projects and case studies should be encouraged to demonstrate the synergies between biodiversity, nutrition and socio-economic, cultural and environment sustainability as well as to gather evidence about the potential of greater use of biodiversity for better nutrition and health and for poverty alleviation and improved livelihoods. The evidence gathered from these research efforts should be compiled by FAO and Bioversity International and made available on an open access web-based platform.

5. Food based dietary guidelines and policies should give due consideration to sustainability when setting goals aimed at healthy nutrition. A guidance document on how to develop such guidelines and policies at national level could be elaborated by FAO, in collaboration with Bioversity International and other partners.

6. Governments, UN Agencies, Civil Society, Research Organizations and the Private Sector should collaborate in the development of programme activities and policies to promote sustainable diets in order to achieve sustainable food production, processing and consumption, and to minimize environmental degradation and biodiversity loss.

7. The development of a Code of Conduct for Sustainable Diets is strongly recommended.

Biodiversity and nutrition

- Dietary energy supply can be satisfied without diversity
- Micronutrient supply cannot be satisfied without diversity

“Agro-biodiversity is a matter of life and death for us. We cannot separate agrobiodiversity from food security.”

—Salvadoran delegation to the Conference of Parties, Convention on Biological Diversity, 2006

Biodiversity= Dietary Diversity= Improved Nutrition

- 250 000 plant species are known to humans
- A species provides more than 70% of human food
- At least 2 species provide over 30% of human food

PLATFORM FOR ACTION

1. The participants of the Symposium recommend that FAO, Bioversity International and the CBD Secretariat, in collaboration with other relevant organizations and institutions at international/regional/national/local level should establish a Task Force to promote and advance the concept of sustainable diets and the role of biodiversity within it, in the context of the CBD Cross-cutting Initiative on Biodiversity for Food

2. FAO and Bioversity International should encourage the UN System, Governments, International Organizations, International Food Security and Nutrition Initiatives and other relevant bodies to finance and support research and development projects and programmes on biodiversity and sustainable diets.
### Extent of genetic uniformity in rice

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of varieties grown</th>
<th>Part</th>
<th>Present</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>3,000</td>
<td>23</td>
<td></td>
<td>&gt;70% of area cultivated under three varieties</td>
</tr>
<tr>
<td>Japan</td>
<td>1,102</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rep. of Korea</td>
<td>4,227</td>
<td>12</td>
<td></td>
<td>&gt;82% of area cultivated under three varieties</td>
</tr>
<tr>
<td>Philippines</td>
<td>-</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2,000</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taiwan Province</td>
<td>1,079</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>of China</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>16,185</td>
<td>37</td>
<td></td>
<td>50% of area cultivated under two varieties</td>
</tr>
</tbody>
</table>

Source: Pandya, 1999

### International Rice Commission

The Commission recommends that:
- Existing rice biodiversity needs to be explored to find varieties with higher vitamin A content.
- Nutrient content needs to be among the criteria in cultivar selection.
- Cultivar-specific nutrient analysis and data dissemination should be systematically undertaken.


### Differences in food composition

<table>
<thead>
<tr>
<th>Food</th>
<th>Protein g</th>
<th>Fibre g</th>
<th>Iron mg</th>
<th>Vitamin C mg</th>
<th>Beta-Carotenes mcg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice</td>
<td>5.6 - 14.6</td>
<td>0.7 - 6.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cassava</td>
<td>0.7 - 6.4</td>
<td>0.9 - 1.5</td>
<td>0.3 - 2.5</td>
<td>25 - 34</td>
<td>&lt;5 - 796</td>
</tr>
<tr>
<td>Potato</td>
<td>1.4 - 2.9</td>
<td>1.2 - 2.5</td>
<td>0.3 - 2.7</td>
<td>5.4 - 16.9</td>
<td>1 - 7.7</td>
</tr>
<tr>
<td>Sweet potato</td>
<td>1.3 - 2.1</td>
<td>1.7 - 3.9</td>
<td>0.6 - 2.8</td>
<td>1.4 - 35</td>
<td>100 - 23100</td>
</tr>
<tr>
<td>Turn</td>
<td>1.3 - 3.8</td>
<td>2.1 - 3.8</td>
<td>0.6 - 3.6</td>
<td>2 - 15</td>
<td>5.2 - 2400</td>
</tr>
<tr>
<td>Mango</td>
<td>0.3 - 1.0</td>
<td>1.3 - 3.8</td>
<td>0.4 - 2.8</td>
<td>22 - 110</td>
<td>20 - 4320</td>
</tr>
<tr>
<td>GAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6180 - 13720</td>
</tr>
<tr>
<td>Apricot</td>
<td>0.8 - 1.4</td>
<td>1.7 - 2.5</td>
<td>0.3 - 0.9</td>
<td>5.1 - 16.5</td>
<td>200 - 6939 (beta carotene equivalent)</td>
</tr>
<tr>
<td>Banana</td>
<td>0.1 - 1.8</td>
<td>2.5 - 17.5</td>
<td>&lt;1 - 4500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Impact of food biodiversity on dietary adequacy

<table>
<thead>
<tr>
<th>Protein content (g/100 g)</th>
<th>Protein content (mg/100 g)</th>
<th>Cassava intake in %</th>
<th>Part of the RDI for protein covered by cassava intake, in %</th>
<th>Vitamin A intake through cassava in %</th>
<th>RDI for vitamin A covered by banana intake, in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average 3.24</td>
<td>286</td>
<td>20.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum 0.95</td>
<td>286</td>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum 6.42</td>
<td>286</td>
<td>40.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banana β-carotene content in μg/100 g</td>
<td>Banana intake in %</td>
<td>Vitamin A intake through banana in μg RE/100</td>
<td>RDI for vitamin A covered by banana intake, in %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USDA 26</td>
<td>93</td>
<td>4</td>
<td>0.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locatan 360</td>
<td>93</td>
<td>56</td>
<td>9.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utica Iap 8508</td>
<td>93</td>
<td>1318.7</td>
<td>219.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Training

- Since 1992, about 600 professionals were trained in over 20 courses, most of them did not include biodiversity
- FAO/INFOODS Food Composition Study Guide includes one module on biodiversity

Food Composition Database on Biodiversity

- contains only analytical data for 182 components (macronutrients, vitamins, minerals and heavy metals, phytoestrogens, FA, AA)
- Launched in December 2010 with 2400 foods: 1514 entries on potatoes (over 700 varieties), 27 on other roots and tubers, 444 on milk (from 14 species with 5 to 54 breeds per species), 316 on fruits, 30 on cereals, 24 on legumes, 30 on nuts and seeds, and 32 on vegetables.
- in December 2011 second edition with expected 5000 foods: more on fish, vegetables, fruits

Advocacy material produced by FAO

Vitamin A deficiency in Micronesia

- Traditionally, vitamin A deficiency was not known
- With shift to westernized diets (e.g. white rice and mutton tails) vitamin A deficiencies arrived
- Nutrition programme developed based on green leafy vegetables did not work as considered ‘pig foods’
- Exploration of traditional diets showed that local varieties of bananas and taro were very rich in carotenoids -> current programme re-introduces the traditional diet seems to work. See http://www.islandfood.org

Prevention of vitamin A deficiency

1. Food-based approach -> increased evidence that it works
   - Food biodiversity including wild and underutilized foods
   - Traditional foods revival
   - Nutrition education
   - Change in agriculture production and homegardening

The Great Vitamin A Fiasco (M. Latham)

• "Vitamin A (capsule) programmes are ineffective. They use up precious human and material resources. Most of all, they impede other approaches to the prevention of vitamin A deficiency [...]. These include breastfeeding, and the protection and development of healthy, affordable and appropriate food systems and supplies. Such approaches also protect against other diseases, are sustainable, enhance well-being, and have social, cultural, economic and environmental benefits."
• "capsules do not have a significant effect on mortality" but de-worming and measles vaccination are effective
• "exceedingly rich sources of carotene such as palm and other fruits, tend to be overlooked [...], one reason being that they often grow wild, and even when cultivated do not feature in international or national food composition tables.”

Policies/governments
- change subsidy policies
- more countries to follow the example of Denmark in Fat Taxes?
- include more nutritious foods in food baskets for low income groups, e.g. less polished rice, more fruits and vegetables high in vitamin A and other micronutrients
- reconsider fortification and supplementation programmes – evaluate them for efficiency and impact on mortality and morbidity

Agriculture
- change food production including less inputs (energy, fertilizers, pesticides)
- explore existing biodiversity, including its compositional data
- include criteria on compositional data to develop and produce more nutrient-rich foods on large scale
- decrease food losses and waste

Food-based approach with biodiversity vs. supplementation/fortification

Optimal food with
• high nutrient content
• high yield and pest resistance
• high acceptance by population
• acceptable price

Biodiversity
Food composition analysis
Agricultural research

better nutrition and health
Income generation

Production and distribution
Nutrition education
Promotion/ads

Nutritionists
• shift to food-based approaches
• explore regional and cultural habits and food biodiversity
• increase diversity of diets, including valuing traditional and wild foods
• promote the decrease of meat consumption where high
• include biodiversity in our work
• talk about biodiversity and sustainable diets widely (conferences, meetings...)
• get more professionals and consumers convinced about the importance of food biodiversity and sustainable diets
• send data on food composition and consumption on food biodiversity to FAO

Institutionalized kitchens (hospitals, schools, etc)
• buy locally if possible and cook freshly
• use foods varieties with high nutritional values
• propose more vegetarian foods which are tasty
• propose more fruits and vegetables
• organize events to develop the taste of kids
• use less fat, salt and sugar in preparations (gradually)
Biodiversity & Nutrition

For food composition database compilers:
• Sample and generate nutrient data for wild foods and individual cultivars, also by ecosystem
• Compile these data comprehensively, systematically and centrally, and disseminate widely

For food consumption surveys
• Include biodiversity questions and/or prompts in food consumption surveys
• Report food consumption also by ecosystem and/or ethnic group
• Communicate to food composition database compilers the need for compositional data for these specific foods

For nutrition education
• Investigate traditional foods and varieties
• Promote the most nutritious among them
• Promote home gardening
• Integrated programmes with agricultural production

Food Industry

• less packaging material
• use more renewable energy, less water and reuse ‘waste’ to produce foods
• decrease food loss
• use more varieties with high nutrient content to naturally “fortify” foods (biodiversity)
• use less salt and sugar (gradually)

Consumers

• use less water (e.g. less showers, economic toilet flashing), less energy (e.g. less aircon, less car)
• eat less meat, fatty snacks and soda
• eat more vegetables and fruits
• decrease food loss
• decrease obesity and over-weight
• buy locally if possible and choose varieties with good nutritional profile
• select products with less fat, sugar and salt (read label) and produced with renewable energy
• educate children to eat a diversity of foods and let them appreciate the different tastes
=> consumers are powerful – they decide to buy one product or another

Conclusions

Food composition data are fundamental for nutrition, health and agriculture and need more recognition and funding

Biodiversity can make the difference between nutritional adequacy and inadequacy and professionals and consumers need to know more about it

Biodiversity and food-based approaches are sustainable alternatives to fortification and supplementation (M. Latham: “Time to end quick fixes”)

Sustainable diets are essential to feed future generations
⇒ Basis to improve nutrition, health and food security based on FOODS
⇒ Contribute to preparedness to effects of climate change
⇒ Contribute to conserving and valuing our food biodiversity and our planet for our children and grandchildren

More information on the INFOODS webpage on biodiversity and sustainable diets

Obrigado

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