

Biodiversity and Nutrition: a common path toward sustainable diets

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Outline

- Introduction
- FAOs activities on biodiversity
- Conclusions

Definition Biodiversity

Biodiversity covers diversity within species, between species and of ecosystems;
synonyms: biological diversity, ecological diversity



Schema of taxonomic names

Schema	Plant – example	Plant – example	Fish - example	Animal – example
Family	<i>Rosaceae</i> – Rose family	<i>Poaceae</i> – Grass family	<i>Pleuronectidae</i>	<i>Bovidae</i> <i>Caprinae</i>
Genus	<i>Prunus</i> L. – plum	<i>Triticum</i> L. – wheat	<i>Platichthys</i>	<i>Ovis</i>
Species	<i>Prunus domestica</i> L. – European plum	<i>Triticum aestivum</i> L. – common wheat	<i>Platichthys flesus</i> (Linnaeus, 1758)	<i>Ovis aries</i> – sheep
Subspecies	<i>Prunus domestica</i> L. subsp. <i>domestica</i>			(rarely used)
Variety Cultivar Breed	<i>Prunus domestica</i> L. var. <i>domestica</i> – European plum <i>Prunus domestica</i> ‘Cacak’s Beauty’	<i>Triticum aestivum</i> ‘Pioneer 2163’	<i>Platichthys flesus</i> var. <i>marmorata</i> No rdmann, 1840 - European flounder	Suffolk

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Biodiversity and nutrition

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

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

—Zambian delegate to the Conference of Parties, Convention on Biological Diversity, May 1998



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Links between biodiversity, food and nutrition recognized by

- Convention on Biological Diversity (CBD)
- Conference of the Parties of CBD: Decision VII/32
- Millennium Development Goals (MDG)
- Cross-cutting initiative on biodiversity for food and nutrition (IBFN)
- Intergovernmental Working Group on Plant Genetic Resources
- International Rice Commission

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Biodiversity & Nutrition Rationale

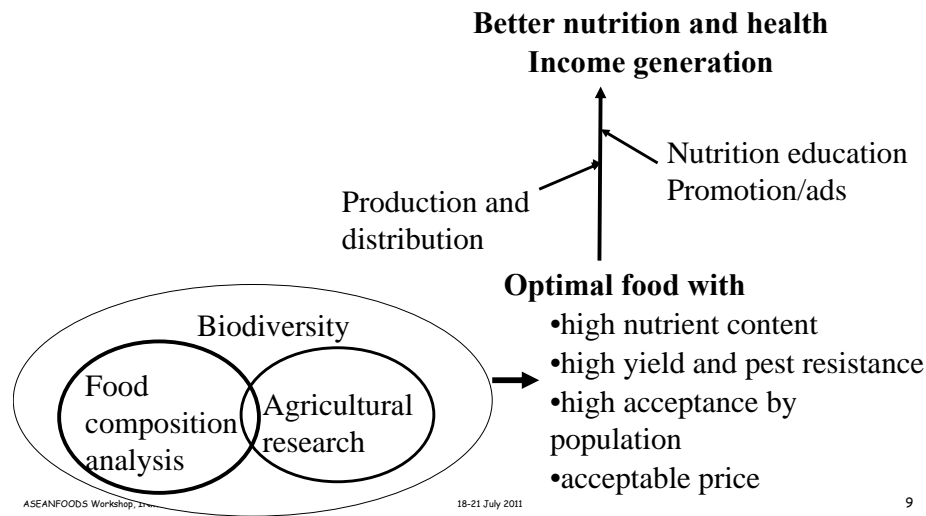
- Wild species and intraspecies biodiversity have key roles in global food security
- Different varieties have statistically different nutrient contents
- Nutrient content needs to be among criteria in cultivar promotion
- Knowledge on nutrient data on existing biodiversity needs to be a prerequisite for decision-making in GMO work
- Knowledge on nutrient data and intake data of varieties is essential in order to understand the impact of biodiversity on food security
- investigate and disseminate the nutrient and non-nutrient composition of wild foods and of foods at cultivar level
- include biodiversity questions and/or prompts in food consumption surveys

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Food-based approach with biodiversity vs. supplementation/fortification

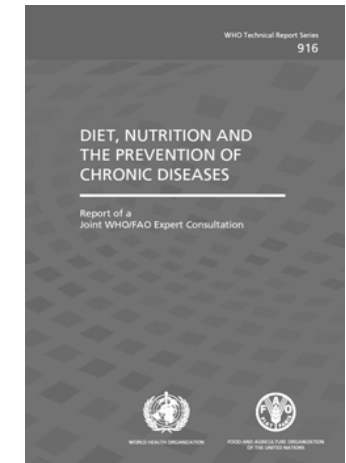


The double burden of malnutrition

Food composition data form the basis by which dietary adequacy is assessed – both under- and overnutrition.

Food composition data are the fundamental information by which dietary intake goals can be established and achieved.

The importance of wild and underutilized species to food security – relevant to both the health and agriculture sectors – will only be realized when more data are available on composition and intake.



Differences in food composition

	Protein g	Fibre g	Iron mg	Vitamin C mg	Beta-Carotenes mcg
Rice	5.6 - 14.6		0.7 - 6.4		
Cassava	0.7-6.4	0.9-1.5	0.9-2.5	25-34	<5-790
Potato	1.4-2.9	1-2.23	0.3-2.7	6.4-36.9	1-7.7
Sweet potato	1.3-2.1	0.7-3.9	0.6-14	2.4-35	100-23100
Taro	1.1-3	2.1-3.8	0.6-3.6	0-15	5-2040
Eggplant		9 - 19		50 - 129	
Mango	0.3 - 1.0	1.3-3.8	0.4-2.8	22-110	20 - 4320
GAC					6180 - 13720
Apricot	0.8-1.4	1.7-2.5	0.3-0.9	3.5-16.5	200-6939 (beta carotene equivalent)
Banana			0.1-1.6	2.5-17.5	<1 - 8500

Impact of food biodiversity on dietary adequacy

Protein content	Protein content (g/100 g)	Cassava intake in Congo g/d/p	Part of the RDI for protein covered by cassava intake, in %
Average	3.24	286	20.6
Minimum	0.95	286	6.0
Maximum	6.42	286	40.8

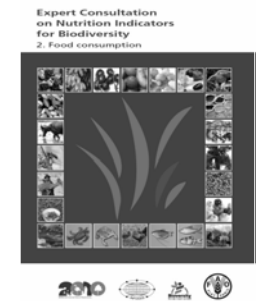
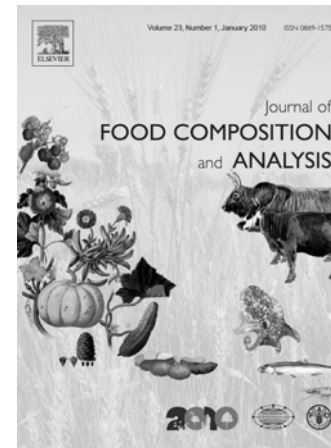
Banana	β-carotene content in mcg/100 g	Banana intake in Philippines in g/d/p	Vitamin A intake through banana in mcg RE/d/p	RDI for vitamin A covered by banana intake, in %
USDA	26	93	4	0.7
Lacatan	360	93	56	9.3
Utin Iap	8508	93	1318.7	219.8

Training

- Since 1992, 550 professionals were trained in 21 courses out of which 2 courses included many topics on biodiversity (Benin, Ghana)
- FAO/INFOODS Food Composition Study Guide includes one module on biodiversity (in E, F, S)



Improving the Evidence



Nutrition indicators for biodiversity - objectives

- To monitor biodiversity over time by measuring the composition and consumption of food and medicinal plant and animal genetic resources
- To encourage researchers to generate and compile more food consumption and compositional data for food biodiversity
- To enable more research on food biodiversity and nutrition and health
- To raise awareness of the population, researchers and governments on food biodiversity and their impact on dietary adequacy
- To understand the impact of food biodiversity on food security

Nutrition indicators for biodiversity

They count the number of foods

- at variety/ cultivar/ breed level for common foods
- species level for wild/ (indigenous)/ underutilized foods
- with at least one value for component or reported by at least one subject
- found in published and unpublished literature

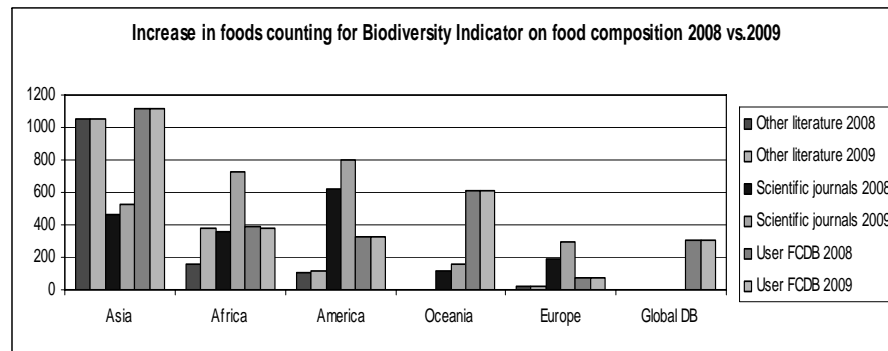
The two indicators:

1. **on food composition** (FAO, 2008) → yearly reporting (in 2010 over 3600 foods reported in FCDB, scientific literature etc)
2. **on food consumption** (2010 and 2011) → reporting every second year (in 2010 over 3000 food reported in food consumption surveys on food biodiversity)

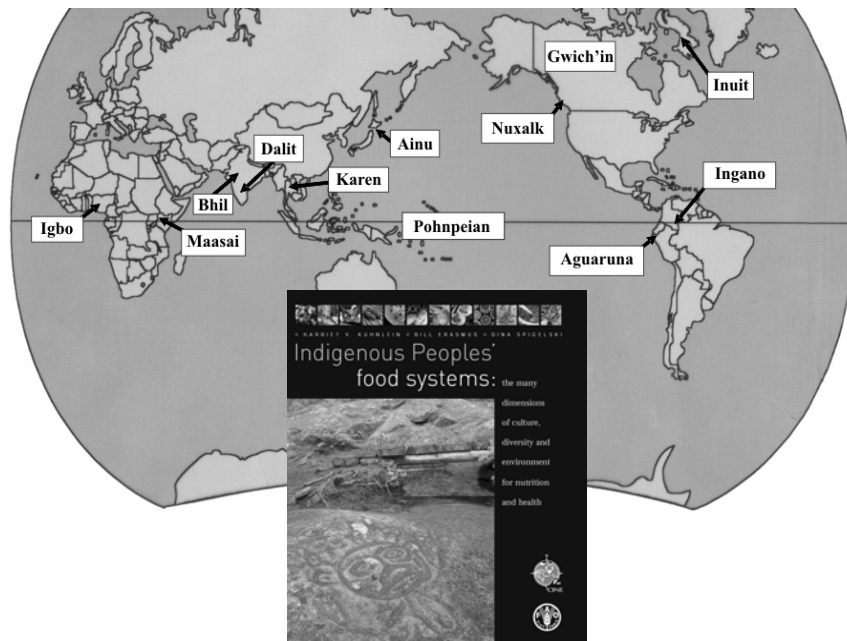
FAO/INFOODS database on biodiversity

- compiled with FAO/INFOODS Compilation Tool
- data from published and unpublished sources on varieties, cultivars, breeds and wild and underutilized foods
- now with data on potato, milk, fruits and vegetables, fish, fruits, underutilized root and tubers, cereals etc and more data to come (vegetables)

At http://www.fao.org/infoods/biodiversity/index_en.stm



Coverage: over 50 countries and 300 publications



Developing and Using Local Food Posters: Food Composition Data and Health Messages

POHNPEI BANANAS (UHT KAN EN POHNPEI): CAROTENOID-RICH VARIETIES

Kisin mwengehn Pohnpei kan me kolokol "Vitamin A" laud

Pohnpei Carotenoid-Rich Foods

Biodiversity & Nutrition – implications

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

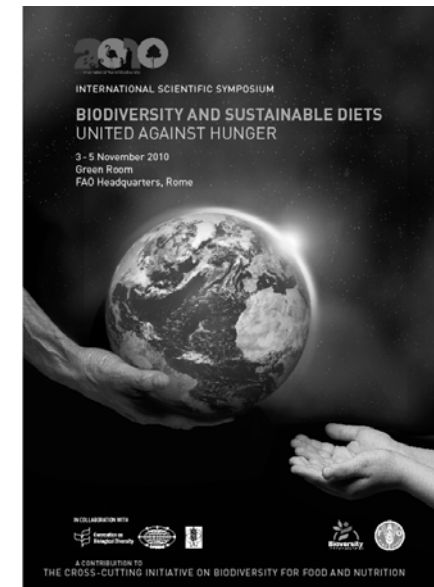
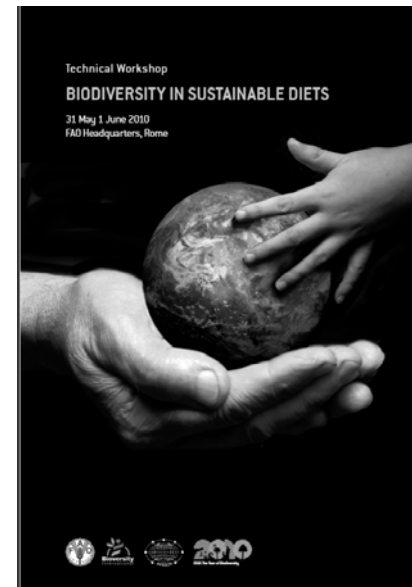
- Include biodiversity questions and/or prompts in food consumption surveys
- Report food consumption also by ecosystem and/or ethnic group
- Communicate to food composition database compilers the need for compositional data for these specific foods

For nutrition education

- Investigate traditional foods and varieties
- Promote the most nutritious among them

For agriculture policies and programmes

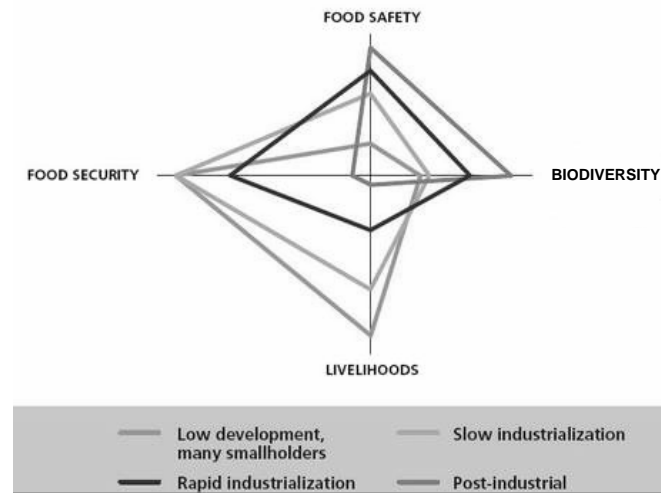
- Nutrient content needs to be among criteria in promoting food biodiversity



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.

Challenges



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

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

More information ...

INFOODS webpage

- on biodiversity
http://www.fao.org/infoods/biodiversity/index_en.stm
- in Food Composition Study Tool module 12 on biodiversity
http://www.fao.org/infoods/publications_en.stm
- in future: compilation of compositional data on food biodiversity

Bioversity International webpage on biodiversity and nutrition
<http://www.bioversityinternational.org/Themes/Nutrition/index.asp>

What we all can do to

- include biodiversity in our work
 - talk about biodiversity widely (conferences, meetings...)
 - report data to FAO
 - get more professionals and consumers convinced about the importance of food biodiversity
 - send data on food composition and consumption on food biodiversity to FAO
 - subscribe to INFOODS mailing list
- ➔ contribute to conserving and valuing our food biodiversity for our children and grandchildren