Nutrition Indicators for Biodiversity
toward sustainable diets

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Schema of taxonomic names

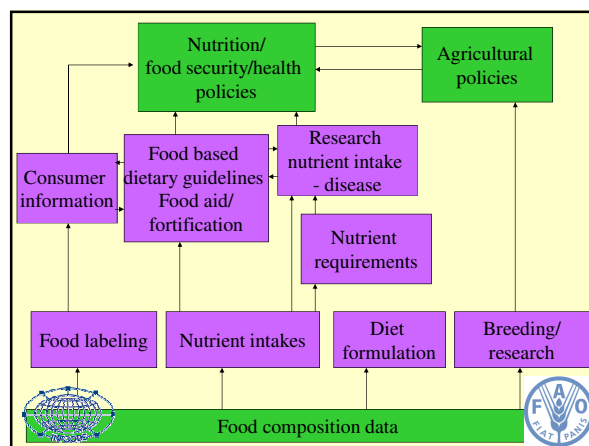| Schema	Plant – example	Plant – example	Fish - example	Animal – example
Family	*Rosaceae*– Rose family	*Poaceae*– Grass family	*Pleuronectidae*	*Bovidae Caprinae*
Genus	*Prunus* L. – plum	*Triticum* L. – wheat	*Platichthys*	*Ovis*
Species	*Prunus domestica* L. – European plum	*Triticum aestivum* L. – common wheat	*Platichthys flesus* (Linnaeus, 1758)	*Ovis aries* – sheep
Subspecies	*Prunus domestica* L. subsp. *domestica*			(rarely used)
Variety Cultivar Breed	*Prunus domestica* L. var. *domestica* – European plum *Prunus domestica* 'Cacak's Beauty'	*Triticum aestivum* 'Pioneer 2163'	*Platichthys flesus* var. *marmorata* Nordmann, 1840 - European flounder	Suffolk

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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

Nutrition/ food security/health policies

Agricultural policies

Consumer information

Food based dietary guidelines Food aid/ fortification

Research nutrient intake - disease

Nutrient requirements

Food labeling

Nutrient intakes

Diet formulation

Breeding/ research

Food composition data

Improving the Evidence

Food Biodiversity

- **Two Nutritional Indicators for Biodiversity** in English, French and Spanish:
  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)

Nutrition indicators for biodiversity

It is a count of the number of foods
- at variety/ cultivar/ breed level for common foods
- species level for wild or underutilized foods
- with at least one value for component or a food reported to be consumed
- found in published and unpublished literature

Interpretation
- show the interest and awareness of importance of biodiversity and the degree of its explored knowledge of food composition and consumption
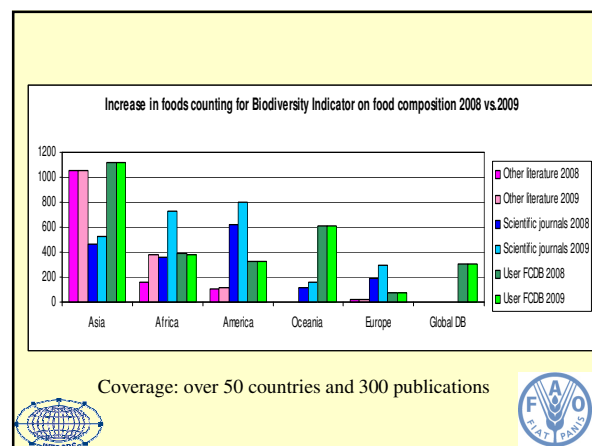
Nutrition indicators for biodiversity - objectives

- To monitor biodiversity over time by measuring the composition and consumption of foods
- 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

| Foods included	Foods not included

- Commonly consumed foods documented at variety, cultivar or breed level
- Wild or underutilized foods even on species level
- Different parts of the foods: e.g. egg, meat, organ meat, leaf, tuber
- Only analyzed foods if in scientific literature
- Foods in food composition tables/databases foods with analytical and/or non-analytical values
	- Commonly consumed foods documented
	   - at species level only
	   - without taxonomic name
	   - at species level and a color indication
	- Foods with generic names, e.g. green leaves
	- Variation in composition due to different climate, soil, processing etc, e.g. no cooked foods if raw food counted

Coverage: over 50 countries and 300 publications

Increase of data availability in 2010
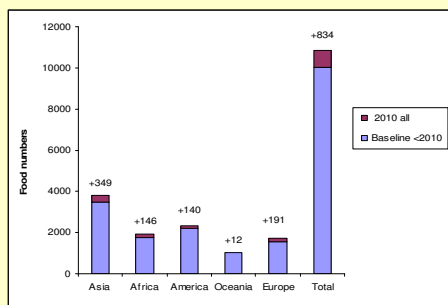
Distribution in reporting of variety/ cultivar/ breed of common foods vs. wild/ indigenous foods in food composition databases
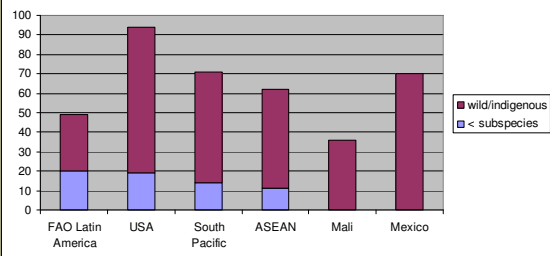
Nutrition indicator for biodiversity - 2. food consumption 2009
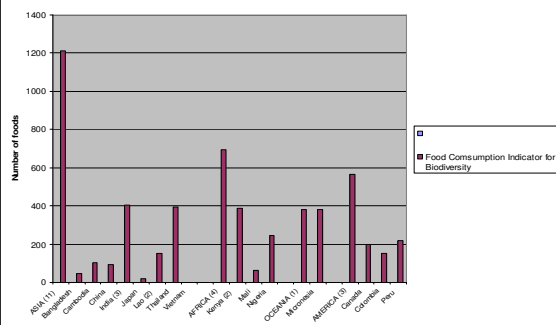
2852 foods reported worldwide counting for biodiversity, most in Asia. Non from Brazil

Template for reporting on food composition – with food list

Publication	Material examined	Ref.	Number of foods at subspecies level and below with following number of components			
			1	2 – 9	10 – 30	> 30
1. Food composition databases (FCDB)						
Reference database						
User database						
Other national FCDB						
2. Literature						
Peer-reviewed journals						
Laboratory reports						
Reports from research institutes						
Conference presentations (incl. posters)						
Theses						
Other (specify)						

DIETARY ASSESSMENT INSTRUMENTS

Methods	Potential for being adapted	Useful as preliminary work to be done before adaptation
Food balance sheets	Low	Low
Market surveys	High	Medium
Biological inventory surveys	Low	High
Household budget surveys	Low to medium	Low
Qualitative survey	Low to medium	Low
Duplicate portion method Coping strategy index	Low	Low
Dietary history	Medium	High
Food records	Medium to high	High
Recall (e.g., 24-h or repeated)	High	High
Food frequency questionnaire	Medium to High	High
Inventory of food biodiversity from key informants, interviews, community focus groups and observation, ethnobiology (people based)	High	High

TEMPLATE FOR REPORTING FOODS CONTRIBUTING TO INDICATOR 2

The template can be used for any level of aggregation: ecosystem, sub-national, national, regional and global.

Type and scope of survey	Bibliographic reference	Time/ date of survey	Geographic/ethnic coverage	Number of subjects and short description* if possible	Instrument used	Study and/or instrument adapted to capture biodiversity yes/no/unknown	Total number of foods in survey	List of foods contributing to Indicator 2 (according to criteria)**	Indicator 2 (number of foods according to criteria)

* Age, sex, education or number of households, culture, socio-economic status
** If many foods are reported, the food list should be given in an annex

Food Composition Database on Biodiversity

- contains **only analytical** data for 182 components (macronutrients, vitamins, minerals and heavy metals, phytoestrogenes, 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
- Download free-of-charge from INFOODS website http://www.fao.org/infoods/biodiversity/index_en.stm

Food Composition Database for Biodiversity - Objective

To provide analytical data on the composition of foods at the level of food biodiversity free-of-charge to any professional in need of such data enabling them to:

- include more food biodiversity data into national and regional FCDB
- study the contribution of food biodiversity to nutrition (e.g. adequacy) and food security
- select foods with an interesting nutrient profile for increased agricultural research and production, and for nutrition education
- provide alternatives for food fortification or supplementation

Food Composition Database for Biodiversity

Data Entry
- 98% done at FAO
- Each person supplying at least 10 food entries compiled into the FCDB on Biodiversity together with documentation will be mentioned as compiler
- About 40 foods from Brazil (fruits and milk)

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.

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 is an alternative to fortification and supplementation (M. Latham: "Time to end quick fixes")

Sustainable diets are essential to feed future generations

FAO would appreciate receiving food composition and consumption data from Latin America on biodiversity

More information on the **INFOODS** webpage on biodiversity and sustainable diets

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

Obrigado

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