Expert Consultation on Nutrition Indicators for Biodiversity

1. Food composition

INFOODS

Bioversity International

FAO FIAT PANIS

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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FOREWORD

Assessing nutrition and biodiversity together, using a suite of indicators, is at the heart of the new *Cross-cutting Initiative on Biodiversity for Food and Nutrition*, led by FAO in collaboration with Bioversity International and other partners.

Biodiversity and nutrition play their parts at three levels – ecosystems, the species they contain, and the genetic diversity within species. The aim of the initiative is to develop measurement tools and indicators at these levels, addressing nutrient ***composition*** and ***consumption*** of underutilized, uncultivated, indigenous foods of plant and animal origin.

Further research is needed to increase the evidence base to fill knowledge gaps with better inventories and information on nutrient composition and consumption of foods at the species and intra-species level, and within specific agro-ecological zones. For nutrition, this means introducing more nutrient composition data on biodiversity in food composition databases and tables; developing and using dietary assessment instruments that capture food intake at the species and variety/breed level; and allowing food labelling that encourages awareness of the often unique composition of these neglected, nutritionally-rich foods.

Nutrition and biodiversity feature directly the Millennium Development Goals: halve the proportion of people who suffer from hunger; and ensure environmental sustainability. In combination, a nutrition and biodiversity initiative provides the very foundation for achieving these MDGs.

This document presents a food composition indicator for biodiversity and nutrition. The indicator will contribute to monitoring and achieving the MDGs and many other important goals. The ultimate goal, however, is to bring awareness of biodiversity to the nutrition sector, and thus help us value, sustainably promote and preserve our planet's biodiversity for food and nutrition security for all.

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ACKNOWLEDGEMENTS

FAO is grateful for the very valuable contribution of the experts to the development of the nutrition indicator for biodiversity related to food composition, all of whom have collaborated in efforts toward the sustainable development and use of biodiversity for nutritional security. Special appreciation is due to Suzanne Murphy, who served as Chairperson of the Consultation, and to Harriet Kuhnlein and I. Francisca Smith, who served as rapporteurs. The Government of Brazil deserves a special note of thanks for its agreement to host the Consultation, and for providing the able assistance of a liaison officer from the Ministry of External Relations.

FAO and INFOODS express gratitude to Professors Elizabete Wenzel de Menezes and Franco Lajolo for their leadership as co-convenors of the 7th International Food Data Conference, which had the theme *Food Composition and Biodiversity*, and to which this Expert Consultation was a satellite meeting, and also to the members of LATINFOODS and all the INFOODS Regional Data Centres, who played dynamic roles in both the Consultation and the Conference.

The Consultation expresses its appreciation for the overall leadership, preparation and execution of the meeting to Barbara Burlingame and Ute Ruth Charrondière, AGNA, FAO; to Pablo Eyzaguirre, Bioversity International; and to Professor Elizabete Wenzel de Menezes, University of São Paulo. It also expressed its gratitude to U. Ruth Charrondière, Barbara Burlingame, Harriet Kuhnlein, I.Francisca Smith and Suzanne Murphy for preparation of the report. The Consultation is grateful to Giuseppina Di Felice for the layout of the report.

ACRONYMS AND ABBREVIATIONS

AOAC	Association of Official Analytical Chemists
CBD	Convention on Biological Diversity
CBD-CoP	Conference of the Parties to the Convention on Biological Diversity
CGRFA	Commission on Genetic Resources for Food and Agriculture
cv.	Cultivar (from cultivated + variety)
EuroFIR	European Food Information Resource Network
FAO	Food and Agriculture Organization of the United Nations
FCDB	Food Composition Databases
ICNCP	International Code of Nomenclature for Cultivated Plants
ICZN	International Commission on Zoological Nomenclature
INFOODS	International Network of Food Data Systems
MDG	Millennium Development Goal
UPOV	International Union for the Protection of New Varieties of Plants

SUMMARY

The development of nutrition indicators for biodiversity is a collaborative international process, led by the Food and Agriculture Organization of the United Nations (FAO), together with Bioversity International and other partners. The task is part of the work of the Initiative on Biodiversity for Food and Nutrition, which was formally established in 2006 by Decision VIII/23 A of the Conference of the Parties to the Convention on Biological Diversity (CBD-CoP).

The initiative was launched on the basis of a recognized linkage between biodiversity, food and nutrition, the need to enhance sustainable use of biodiversity to combat hunger and malnutrition, its contribution to the MDGs (CBD-CoP, Decision VII/32) and the request of the Commission on Genetic Resources for Food and Agriculture (CGRFA, 10th session) to the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture to "provide guidance to FAO on how it could best support countries, on request, to generate, compile and disseminate cultivar-specific nutrient composition data, as well as indicate the relative priority of obtaining cultivar-specific dietary consumption data, in order to demonstrate the role of biodiversity in nutrition and food security."

The Expert Consultation on Nutrition Indicators for Biodiversity was held on 21 October 2007 in São Paulo, Brazil, and assembled 16 experts on biodiversity and food composition from 13 countries. The aim of the Consultation was to develop a food composition indicator for biodiversity and nutrition. Such an indicator is needed with a view to reporting on progress made in biodiversity and the generation, compilation and dissemination of food composition data below the species level, i.e. at variety level for plants and breed level for animals.

The experts agreed on a set of indicators on food composition to measure progress on biodiversity by counting the number of foods with a sufficiently detailed description to identify genus, species, subspecies and variety/cultivar/breed, and with at least one value for a nutrient or other bioactive component. The indicator will be based on well-documented literature, including national, regional or international food composition databases and scientific literature. Reporting will be carried out through the INFOODS Regional Data Centre Coordinators, FAO or others.

It is hoped that this indicator will stimulate the collection and dissemination of food composition data on foods at subspecies level in general and specifically on indigenous and traditional foods. These data will be useful in demonstrating the importance of cultivar-specific composition data, their impact on nutrient intakes and the link between biodiversity, nutrition and food security.

1 OBJECTIVES

- to ***identify*** existing data and data sources needed to develop a nutrition indicator for biodiversity related to food composition;
- to ***propose*** a nutrition indicator for biodiversity related to food composition;
- to ***identify*** data gaps and research needs (e.g. sampling, reporting) in order to improve the indicator;
- to ***develop*** a mechanism for reporting, which will allow FAO to monitor the indicator over time;
- to ***identify*** agencies and institutes that will report to FAO on the indicator on a yearly basis.

2 BACKGROUND

The development of nutrition indicators for biodiversity is an international collaborative process, led by the Food and Agriculture Organization of the United Nations (FAO), together with Bioversity International and other partners. This initiative responds to an emerging global consensus that the simplification of diets, the growing incidence of chronic diseases related to nutrition-poor, energy-rich diets, and the neglect and decline in the use of locally available nutritionally rich foods are linked; and that biodiversity is the source of many foods and dietary components that can contribute to reversing this unhealthy trend (Johns and Sthapit, 2004). Although biodiversity is considered essential for food security and nutrition, and can contribute to achievement of the MDGs through improved dietary choices and positive health impacts, it is seldom included in nutrition programmes and interventions. This is mostly due to the lack of sufficient data on the nutritional value of local foods sourced from biodiversity and also the lack of methods for obtaining, analysing and using data on biodiversity in food consumption studies and nutritional programmes.

In 2004, the Conference of the Parties to the Convention on Biological Diversity (CBD-CoP) recognized the linkage between biodiversity, food and nutrition and the need to enhance sustainable use of biodiversity to combat hunger and malnutrition, and thereby contribute to Target 2 of Goal 1 of the MDGs (Decision VII/32). The Cross-cutting Initiative on Biodiversity for Food and Nutrition was formally established by Decision VIII/23 A of the Conference of the Parties in March 2006. During this same period, the Commission on Genetic Resources for Food and Agriculture (CGRFA, 10th session) requested the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture to "provide guidance to FAO on how it could best support countries, on request, to generate, compile and disseminate cultivar-specific nutrient composition data, as well as indicate the relative priority of obtaining cultivar-specific dietary consumption data, in order to demonstrate the role of biodiversity in nutrition and food security."

Existing food composition databases vary across regions and countries, but all include a range of foods and nutrients, and some include subsets of bioactive non-nutrients (including those with medicinal properties), antinutrients and contaminants. Historically, the main purpose of a food composition database was to provide representative, year-round, nation-wide mean values for foods. These average measures can disguise large differences.

Similarly, dietary assessment instruments have been developed to capture the usual or habitual intakes of foods as reported by subjects in a study. Until recently there was little demand to provide compositional data at the subspecies level and below, because the traditional users of the data – those conducting dietary assessments – recorded intake data only at a more generic level. Conversely, diet surveys did not attempt to collect intake information below the level of species, because compositional data were not available for evaluation and because it was widely believed that survey participants were not able to recognize foods at subspecies level and below. However, recent research suggests that this is not the case. A survey in Bangladesh (Kennedy *et al.*, 2005) has shown that over 80 percent of households were able to identify rice by cultivar and 38 different cultivars were named.

If in the future food composition data generators and compilers publish data at subspecies level and below, and food consumption surveys report at this level, then the contribution of biodiversity to a vast range of nutrition initiatives could be determined and evaluated.

Thus, in order to monitor biodiversity and nutrition, at least two indicators will be needed, one on food composition and one on food consumption. The present Consultation will concentrate only on the food composition indicator for biodiversity and nutrition.

3 DEVELOPMENT OF A FOOD COMPOSITION INDICATOR FOR BIODIVERSITY

Many factors are known to affect the nutrient content of foods, including climate, geography and geochemistry, agricultural practices such as fertilization, and the genetic makeup of the species and subspecies. The extent of the influence of genetics is only recently becoming apparent. In rice, for example, it is known that some varieties of *O. sativa* contain 2.5 times more protein and iron than others (Kennedy and Burlingame, 2003). For other crops and nutrients, there can be hundred-fold and thousand-fold differences between varieties of the same species (Englberger *et al.*, 2003a, 2003b, 2003c; Huang *et al.*, 1999).

Nutrition data on indigenous and traditional fruits, vegetables, condiments and spices are limited and fragmented. As the importance of within-species composition data is increasingly being acknowledged, more research is being undertaken to study these differences and their impact on nutrient intakes (Freiberger *et al.*, 1998; Hagenimana *et al.*, 1999; Hagg *et al.*, 1995; Herzog *et al.*, 1994; Huang *et al.*, 1999; Nordeide *et al.*, 1996; Rajyalakshmi and Geervani, 1994; Simonne *et al.*, 1997; Toledo and Burlingame, 2006).

In spite of all this research, few national or regional compositional databases provide data at the cultivar/variety/breed level, although most, if not all, are capable of accommodating such data.

4 DECLARATION OF INTEREST

All experts submitted declarations of interest; none was considered to have a conflict.

5 THE INDICATOR

5.1 Definition of the Indicator

The indicator is a count of the number of foods with a sufficiently detailed description to identify genus, species, subspecies and variety/cultivar/breed, and with at least one value for a nutrient or other bioactive component. More details on the identification of foods and food components contributing to the indicator are given below.

5.2 Food Level

At the food level, the food composition indicator for biodiversity and nutrition (in this and subsequent documents to be referred to as “the indicator”) should include genus, species and subspecies level and below. It may be important to gather additional information on identity, for example local names, specimens, photographs, accurate descriptions.

In cases where information on subspecies level and below is not provided, the food item will not be included as part of the biodiversity indicator, so that foods described simply as “wild green leaves”, “reef fish”, “bush meat” etc. will be excluded.

Exceptions to this general directive are wild or underutilized foods identified by local name with country/region/culture of origin, as well as by a photograph or voucher sample.

The various consumed parts or forms of the same food resource should be counted separately; for example, the root and leaf; larva and adult animal; egg and bird; muscle meat and organ meat.

Foods should be considered in a single state; for example, if raw and cooked forms are both presented, only the raw food should be counted. Cooked-state foods should be counted only when no raw-state data are available.

Although it is recognized that food composition is influenced by factors other than genetics (environment, region, season, processing, feed, production system etc.), it was agreed that such factors would not be taken into account in the indicator, because this would make it too complex and impractical at this time.

It was recognized that in some cases identification with scientific names at subspecies level and below and sometimes even at species level is difficult. For many wild or underutilized foods, taxonomic names do not yet exist, and in other cases, different taxonomy resources may provide different scientific names for the same food. Examples are certain fruits, vegetables, fish, snails and insects. Taxonomy is fluid and there is disagreement among taxonomic authorities at all levels of classification, while non-taxonomists often use taxonomic terms inappropriately. Collaboration with botanists and zoologists will, therefore, be needed for better food identification. In addition, genetic identification techniques or gene banks can be useful as they provide a more standardized identification of the genetic resource.

5.3 Food Component Level

All food components – nutrients and bioactive compounds – need to be considered for the indicator. The minimum requirement for a food to be considered for the indicator is one component. The component(s) can be determined analytically, borrowed or imputed from the same species in another database. In order to assess progress in the availability of component data for a given food, it was decided to report the indicator in the following categories:

- number of foods at subspecies level and below with 1 component;
- number of foods at subspecies level and below with 2 to 9 components;
- number of foods at subspecies level and below with 10 to 30 components;
- number of foods at subspecies level and below with more than 30 components.

It was recognized that the quality of the data should be assessed using standardized criteria, but development and use of quality criteria is beyond the scope of this meeting.

5.4 Publication Level

All published and unpublished data, as long as they are well documented, will be used for the indicator. This includes, but is not limited to, food composition tables and databases, peer-reviewed articles, laboratory reports, reports from research institutes, conference proceedings and poster presentations, and theses.

5.5 Reporting

Reporting on the indicator will be undertaken at three levels:

1. national and regional food composition databases – number of foods meeting the criteria; analytical and non-analytical[1] data for components are acceptable;
2. specialist databases – number of foods meeting the criteria; analytical and non-analytical data[1] for components are acceptable;
3. other published and unpublished literature – number of foods meeting the criteria; only analytical data for components are acceptable.

Reporting on national and regional food composition databases will be undertaken through the INFOODS Regional Data Centre Coordinators.

Reporting on non-nutritive bioactive food components will be undertaken through agreement with the EuroFIR/BASIS database, based on a collection of international scientific articles on bioactive compounds.

Reporting on English-language international scientific literature and databases will be undertaken through the FAO Virtual Library's scientific, health and agriculture abstracting databases and other relevant data resources.

Reporting on non-English-language published and unpublished sources of data will be undertaken through agreements with the relevant INFOODS Regional Data Centre Coordinators.

The reporting will be carried out through a template (see *Annex 4*).

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1 Non-analytical data include data that are borrowed, calculated, imputed or estimated.

6 RECOMMENDATIONS

1. General recommendations:

   - Funding is required for the adequate generation, compilation and dissemination of food composition data that capture elements of biodiversity. Resources should be sought at both national and international levels.
   - The vital role of food composition needs to be stressed in the health, nutrition, agricultural, trade and environmental sectors at both national and international levels.
   - Taxonomic databases need to include more entries on wild foods and foods at the level of subspecies, varieties, cultivars and breeds, so that this information can be used to identify foods for biodiversity.

2. Recommendations to FAO, in cooperation with Bioversity International where relevant:

   - prepare a request for institutional agreements with national and regional compilers;
   - report on the indicator in international fora to raise awareness of the link between biodiversity, nutrition and health;
   - take steps to increase funding for food composition data generation, compilation and dissemination for biodiversity;
   - continue to play a vital role in the generation and dissemination of food composition data globally;
   - facilitate collaboration between food composition data compilers and genetic resource specialists in order to ensure proper identification of plant and animal genetic resources for food;
   - advocate for recognition of the importance of biodiversity at the international level and advise ministers/secretaries of agriculture and other high-level government officials on the need to generate food composition data for this purpose;
   - encourage countries to increase efforts at the national level on biodiversity;
   - assist countries to develop multisectoral policies to encourage the sustainable use of biodiversity for food and agriculture;
   - ensure better quality of published data by disseminating the FAO/INFOODS guidelines on food composition databases to scientific journals, thereby increasing the minimum standards for publication of compositional data, including scientific food identification;

- develop data quality criteria by which future compositional data on biodiversity should be scrutinized;
- disseminate the recommendations of the Expert Consultation widely as advocacy for biodiversity and to increase funding for data generation, compilation and dissemination for biodiversity;
- draw up sampling guidelines for biodiversity.

3. Recommendations to national and regional data generators and compilers:

- generate more and better data on foods at subspecies and variety/cultivar/breed levels; scientific names, i.e. genus, species, variety, should be used, authenticated or documented with digital images, DNA fingerprinting and/or vouchers;
- develop and encourage the use of scientific names for wild and underutilized species, and at subspecies level and below, to enable reporting of the indicator not only with local names but also with scientific names;
- increase collaboration among INFOODS Regional Data Centres in this regard;
- increase use of compositional data at the subspecies level and below and include more wild and underutilized foods in food consumption surveys;
- encourage the inclusion of moisture data together with any food compositional data;
- increase the link with agricultural marketing institutions and departments as well as with research facilities to identify foods consumed at the subspecies level and below and to obtain existing compositional data on them;
- in addition to counting the number of food components available for each indicator food, consider recording the presence or absence of a specified subset of food components for each food item (see *Annex 3*).

ANNEX 1

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ANNEX 2

DRAFT AGENDA

09.00 - 09.15	***Welcome of Participants***	*B. Burlingame* *P. Eyzaguirre*
	Election of chairman and rapporteurs Adoption of agenda	
09.15 - 09.30	Background and objectives of the Expert Consultation	*B. Burlingame*
09.30 -11.00	Discussions of issues connected with the nutrition indicator for biodiversity related to food composition including identification of existing data, data sources, data gaps and research needs	
11.00 -11.30	*Coffee break*	
11.30 -13.00	Discussions of issues connected with the nutrition indicator for biodiversity related to food composition including identification of existing data, data sources, data gaps and research needs	
13.00 -14.00	*Lunch*	
14.00 -16.00	Summary of discussion on the various issues	
	Discussion on development of indicators on food composition	
	Agreement on indicators	
	Discussion of the reporting mechanism	
16.00 -16.30	*Coffee break*	
16.30 -17.30	Recommendations and conclusions Next steps and wrap-up	
	Close of the Expert Consultation	

ANNEX 3

MAIN COMPONENTS FOR REPORTING

Macronutrients	Vitamins	Minerals	Others
Water	**Thiamin**	**Calcium**	Edible part coefficient
Energy in kJ	**Riboflavin**	**Iron**	Cholesterol
Protein	**Folate**	**Iron, haem**	Zeaxanthin
Total nitrogen	**Niacin**	**Iron, non-haem**	Lutein
Available carbohydrates (by weight or by difference) preferred; if not, total carbohydrates (by difference) acceptable	**Vitamin B12**	**Potassium**	Lycopene
Sugars, total; individual sugars	**Vitamin C**	**Magnesium**	Individual amino acids
Starch	**Vitamin A equivalent**	**Manganese**	Individual fatty acids
Dietary fibre (AOAC/Prosky method preferred)	**Retinol**	**Iodine**	Other bioactive compounds
Fat	**Beta carotene**	**Selenium**	
Saturated fatty acids, total	**Alpha carotene**	**Zinc**	
Monounsaturated fatty acids, total	**Beta cryptoxanthin**	**Others**	
Polyunsaturated fatty acids, total	**Vitamin D**		
Trans fatty acids, total	**Vitamin E (TE)**		
Ash	**Alpha tocopherol**		
Alcohol	**Vitamin K**		
Others	**Others**		

ANNEX 4

TEMPLATE FOR REPORTING ON THE NUTRITION INDICATOR OF BIODIVERSITY IN THE FOOD COMPOSITION LITERATURE

A. NATIONAL LEVEL

Name of country:
Sender (name and contact details):
Date:

Publication	**Material examined**	**References**	**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 of national FCDB						
User database of national FCDB						
Other national FCDB						
2. Literature						
National peer-reviewed journals	Indicate journals and years					
National laboratory reports	Indicate laboratories and years					
Reports from national research institutes	Indicate research institutes and years					
National conference presentations (incl. posters)	Indicate conferences and years					
Theses	Indicate universities and years					
Other (specify)	Indicate publication and years					

B. REGIONAL LEVEL

Name of region:
Countries covered:
Sender (name and contact details):
Date:

Publication	**Material examined**	**References**	**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 of regional FCDB						
User database of regional FCDB						
Other regional FCDB						
2. Literature						
Regional peer-reviewed journals	Indicate journals and years					
Regional laboratory reports	Indicate laboratories and years					
Reports from regional research institutes	Indicate research institutes and years					
Regional conference presentations (incl. posters)	Indicate conferences and years					
Other (specify)	Indicate publication and years					

C. INTERNATIONAL LEVEL

Regions and countries covered:
Sender (name and contact details):
Date:

Publication	**Material examined**	**References**	**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 of international FCDB						
User database of international FCDB						
Other food international FCDB						
2. Literature						
International peer-reviewed journals	Indicate journals and years					
Laboratory reports from international institutes	Indicate laboratories and years					
Reports from international research institutes	Indicate research institutes and years					
International conference presentations (incl. posters)	Indicate conferences and years					
Other (specify)	Indicate publication and years					
3. BASIS database						

ADDITIONAL FILES TO BE PROVIDED TOGETHER WITH THE TEMPLATE

Material examined

Letter	Material examined
a	
b	

References

Number	Full reference	DOI, CiteXplore ID[1], other international publication code
1		
2		

[1] CiteXplore http://www.ebi.ac.uk/citexplore/.

ANNEX 5

GLOSSARY[2]

Biodiversity: the variability among living organisms from all sources, including terrestrial, marine and other ecosystems and the ecological complexes of which they are part; it covers diversity within species, between species and of ecosystems; *synonyms*: biological diversity, ecological diversity.

Breed: (1) a subspecific group of animal species, within a single zoological taxon of the lowest known rank, with definable and identifiable external characteristics that enable it to be separated by visual appraisal from other similarly defined groups within the same species; (2) a group of domestic livestock for which geographical and/or cultural separation from similar groups has led to acceptance of its separate identity.

Cultivar (from cultivated + variety) (abbr: cv.): a category of plants that is below the level of a subspecies taxonomically and equivalent taxonomically to variety, and is found only in cultivation; it is an international term denoting certain cultivated plants that are clearly distinguishable from others by stated characteristics and that retain their distinguishing characteristics when reproduced under specific conditions; the naming of a cultivar should conform to the *International Code of Nomenclature for Cultivated Plants* (the *ICNCP*, commonly known as the "Cultivated Plant Code"); a cultivar is named with a cultivar (or fancy) epithet, a word or words in a vernacular language (unless published prior to 1959), or a botanical (Latin) epithet already established for a taxon now deemed to be a cultivar, formed according to the precepts of the code; the epithet is printed in roman characters, not italic, takes a capital first letter and is enclosed in single quotation marks, for example, *Hosta kikutii* 'Green Fountain'; cultivar names, unlike varieties, have generally been registered with an appropriate body in order to associate that name with a particular population and, usually, to claim rights over the population.

Ecosystem: a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit (CBD, 1993).

Species: below the level of genus, species is a class of potentially interbreeding individuals that are reproductively isolated from other such groups having many characteristics in common; species classifications are subject to review and

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[2] Definitions are adapted from FAO, 1999 and FAO, 2001.

change as new genomic and other scientific evidence is considered; by convention, a species is assigned a two-part italicized name in Latin, the genus being listed first (with its leading letter capitalized) and the species second; the name of the species is the whole binomial, not just the second term, for example, apple belongs to the species *Malus domestica*.

Subspecies: population(s) of organisms sharing certain characteristics that are not present in other populations of the same species; the taxonomic naming convention is to append "ssp." or "subspec." and the Latin name in italic to the species name, for example *Prunus domestica* L. subsp. *domestica*.

Underutilized species: for the purpose of this publication underutilized species are defined as species with underexploited potential for contributing to food security, health and nutrition, income generation and environmental services (GFU, 2007). However, 'underutilized species' is not well a well defined term and it depends on the geographical, social, economic and temporal aspects and includes a wide range of wild, traditional, indigenous and local foods. Often, their taxonomic identification is not complete, especially below species level.

Variety: a naturally occurring subdivision of a plant species, within a single botanical taxon of the lowest known rank, with distinct morphological characteristics and given a Latin name according to the rules of the International Code of Nomenclature; a taxonomic variety is known by the first validly published name applied to it, so that nomenclature tends to be stable (cf. cultivar; pathovar); the taxonomic naming convention is to append "var." and the Latin name in italic to the species name, for example *Malus angustifolia* (Ait.) Michx. var. *angustifolia* – southern crabapple; a variety will have an appearance distinct from other varieties, but will hybridize freely with other varieties, if brought into contact; varieties are usually geographically separate from each other; to plant breeders, at least in countries that are signatories to the UPOV Convention, "variety" or "plant variety" is a legal term; in zoological nomenclature, the only officially-regulated rank below that of species is subspecies; forms and morphs are used instead of varieties if needed, but are unregulated by the International Commission on Zoological Nomenclature (ICZN). In bacteriological nomenclature "variety" and "subspecies" are used interchangeably.

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	*Prunus domestica* L. var. *domestica* – European plum		*Platichthys flesus* var. *marmorata* Nordmann, 1840 – European flounder	
Cultivar	*Prunus domestica* 'Cacak's Beauty'	*Triticum aestivum* 'Pioneer 2163'		
Breed				Suffolk

Note:
Cultivar names should always be enclosed in single quotation marks ' ' even though it is not always done. The cultivar name should not be confused with the authors' name of the taxonomic name, e.g. L. or Linn. (for Linnaeus), Roem, (L.) Roem, Bosc, Roxb., Swartz, Mill., Muell., Nordmann etc., which can be followed by a year. It is possible to check the author names through the 'International Plant Names Index – author queries' found at http://www.ipni.org/ipni/authorsearchpage.do.

ANNEX 6

RESOURCES

- Taxonomic websites

  - Plants
    - http://www.ars-grin.gov/cgi-bin/npgs/html/index.pl
    - http://mansfeld.ipk-gatersleben.de/
      http://www.plantnames.unimelb.edu.au/Sorting/Frontpage.html
    - http://www.seedtest.org/en/home.html
    - http://plants.usda.gov/

  - Fish
    - http://www.fao.org/figis/servlet/static?dom=org&xml=sidp.xml&xp_lang=en&xp_banner=fi
    - http://www.fao.org/fi/website/FISearch.do?dom=species
    - http://www.fishbase.org/home.htm
    - http://vm.cfsan.fda.gov/%7Efrf/rfe0.html
    - http://www.nativefish.asn.au/taxonomy.html
    - http://www.nativefish.asn.au/fish.html

  - Plants, animals, fish
    - http://www.ncbi.nlm.nih.gov/sites/entrez?db=Taxonomy
    - http://www.cbif.gc.ca
    - http://www.sp2000.org/

  - Gene bank databases
    - http://www.informatik.uni-leipzig.de/~tkirsten/GenBankManagement.html
    - http://www.bioversityinternational.org/Information_Sources/Species_Databases/Species_Compendium/default.asp

ANNEX 7

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ANNEX 8
SUPPORT FOR COUNTRIES TO GENERATE, COMPILE AND DISSEMINATE CULTIVAR-SPECIFIC NUTRIENT COMPOSITION DATA, AND THE RELATIVE PRIORITY OF OBTAINING CULTIVAR-SPECIFIC DIETARY CONSUMPTION DATA

CGFRA/WG-PGR-3/05/5

October 2005

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منظمة الأغذية والزراعة للأمم المتحدة

联合国粮食及农业组织

Food and Agriculture Organization of the United Nations

Organisation des Nations Unies pour l'alimentation et l'agriculture

Organización de las Naciones Unidas para la Agricultura y la Alimentación

Item 7 of the Draft Provisional Agenda

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

WORKING GROUP ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Third Session

Rome, 26 – 28 October 2005

SUPPORT FOR COUNTRIES TO GENERATE, COMPILE AND DISSEMINATE CULTIVAR-SPECIFIC NUTRIENT COMPOSITION DATA, AND THE RELATIVE PRIORITY OF OBTAINING CULTIVAR-SPECIFIC DIETARY CONSUMPTION DATA

Table of Contents

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1. INTRODUCTION

1. At its Tenth Regular Session, the Commission on Genetic Resources for Food and Agriculture (the "Commission") requested the Intergovernmental Technical Working Group on Plant Genetic Resources for Food and Agriculture (the "Working Group") to "provide guidance to FAO on how it could best support countries, on request, to generate, compile and disseminate cultivar[1]-specific nutrient composition data, as well as indicate the relative priority of obtaining cultivar-specific dietary consumption data, in order to demonstrate the role of biodiversity in nutrition and food security, as presented in document, *Report from FAO on its Policies, Programmes and Activities on Agricultural Biological Diversity: Cross-Sectoral Matters"*.[2] This document has been prepared to address that request.

2. ROLE OF BIODIVERSITY IN NUTRITION AND FOOD SECURITY

2. For many years, FAO has considered food composition and food consumption data to be important to agriculture, health, the environment and trade. In recent years, FAO prepared a Background Study Paper for the Commission in April 2001 on the nutritional value of some crops that were under discussion in the negotiation of the *International Treaty on Plant Genetic Resources for Food and Agriculture*[3]. FAO also published reports and background papers on *Nutritional contribution of rice and impact of biotechnology and biodiversity in rice-consuming countries*[4] and on *Analysis of food composition data on rice from a plant genetic resources perspective*[5] for the International Rice Commission and the International Year of Rice. An extensive listing is provided in the associated information document entitled "FAO's activities in nutrition and biodiversity"[6].

3. In February 2004, Decision VII/32 of the *Convention on Biological Diversity*'s Conference of the Parties (CBD-CoP)[7] noted the linkage between biodiversity, food and nutrition and the need to enhance sustainable use of biodiversity to combat hunger and malnutrition, and thereby contribute to Target 2 of Goal 1 of the Millennium Development Goals[8]. The CBD-CoP requested the CBD's Executive Secretary, in collaboration with FAO and the International Plant Genetic Resources Institute (IPGRI), and taking into account ongoing work, to undertake the necessary consultations and bring forward options for consideration by the CoP at its Eighth Meeting for a ***Cross-cutting initiative on biodiversity for food and nutrition*** (IBFN) within the CBD's existing programme of work on agricultural biodiversity. The CBD's Executive Secretary was requested to work together with relevant organizations, in order to strengthen existing initiatives on food and nutrition, enhance synergies and fully integrate biodiversity concerns into their work, with a view to achieving Target 2 of Millennium Development Goal 1 and other relevant Millennium Development Goals.

4. A consultation on the IBFN was held in Brasilia, on 12-13 March 2005, jointly hosted by FAO, the Executive Secretary of the CBD, and the International Plant Genetic Resources Institute (IPGRI), in order to explore ways to enhance synergies and integrate biodiversity concerns into existing food and nutrition initiatives, in collaboration with other organizations and their initiatives.

[1] For the purposes of this document, the terms "cultivar" and "variety" should be considered synonymous.
[2] CGRFA-10/4/10.2 para.24.
[3] Background Study Paper No.11, *Nutritional Value of Some of the Crops under Discussion in the Development of a Multilateral System,* April 2001, is available on the Commission's web site at http://www.fao.org/ag/cgrfa/docs.htm#bsp
[4] *Proceedings of the 20th Session of the International Rice Commission*, Bangkok, Thailand, 2003. FAO, Rome, p 59-69.
[5] *Food Chemistry* (2003).80:589-596
[6] CGRFA/WG-PGR-3/05/Inf.9.
[7] The text is posted at http://www.biodiv.org/decisions/
[8] To halve, between 1990 and 2015, the proportion of people who suffer from hunger.

5. As specified in the Report of the IBFN[9], FAO and other organizations and initiatives in the scientific community (e.g. the International Union of Nutritional Sciences (IUNS), the United Nations University (UNU), the International Food Data Conference (IFDC) and the United Nations Standing Committee on Nutrition (SCN)), recognized that biodiversity at the species and variety levels provides the basic components of nutrition, including energy, proteins and amino acids, fats and fatty acids, minerals and vitamins, as well as important bioactive "non-nutrients" (e.g. antioxidant phytochemicals). This diversity, including varietal diversity, of fruits, leafy vegetables and other plants and algae is particularly important, but fish and other animal products are also important. Diversity is of particular significance for indigenous communities and for poor and vulnerable communities, especially in times of shortages of major crops. In addition to its role in supporting and sustaining food production, biodiversity, by underpinning dietary diversity, has a role to play in addressing both undernutrition associated with poverty, and obesity-related diseases associated with urbanization, in developed and developing countries.

6. Similarly, in the Report of the IBFN, FAO and other organizations and initiatives in the scientific community recognized that species and varietal differences in nutrient composition can be significant, and that cultivar-specific food composition and consumption data will form the evidence base by which other activities related to nutrition and biodiversity can most effectively be undertaken.

3. GENERATION, COMPILATION AND DISSEMINATION OF CULTIVAR-SPECIFIC NUTRIENT COMPOSITION DATA

7. Many factors are known to affect the nutrient content of foods, including climate, geography and geochemistry, agricultural practices such as fertilization, and the genetic composition of the cultivar. To date, cultivar-specific differences have received the least attention among these. In the past, generic food composition data were considered sufficient for most purposes. However, the usefulness of cultivar-specific composition data is becoming increasingly acknowledged.

8. Sources of new data on cultivar-specific nutrient composition include scientific literature, the International Network of Food Data Systems, regulations governing import/export and substantial equivalence, and analysis of indigenous and wild foods.

9. Recent compositional research has provided data to confirm the micronutrient superiority of some lesser-known cultivars and wild varieties over some more widely-utilized cultivars. For example, Huang and co-workers (1999)[10] reported that sweet potato cultivars in some Pacific Islands differed in their beta carotene content by a factor of 60, yet the low beta carotene varieties were promoted by the agriculture extension workers. Vitamin A deficiency diseases are still pervasive in certain parts of the Pacific, and therefore cultivar-specific nutrient data should be fundamental to related agriculture and nutrition policies and interventions. Promoting indigenous crops rich in micronutrients such as vitamin A precursors has an important role in promoting nutrition in parts of Sub-Saharan Africa, given the high prevalence of HIV/AIDS[11] . Similar papers on the nutrient content of various plant genetic resources have also been published.

10. These trends have been documented by the Secretariat for INFOODS, the International Network of Food Data Systems, operated by FAO in collaboration with the United Nations University. INFOODS, through its standards development, its network of Regional Data Centres[12] and the *Journal of Food*

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[9] Report of the IBFN is available on the CBD web site at http://www.biodiv.org/doc/meeting.aspx?mtg=IBFN-01

[10] Content of Alpha-, Beta-Carotene, and Dietary Fiber in 18 Sweetpotato Varieties Grown in Hawaii. *Journal of Food Composition and Analysis, Volume 12, Issue 2, June 1999, Pages 147-15.* A. S. Huang, L. Tanudjaja and D. Lum.

[11] FAO, 2002. State of Food Insecurity in the World.

[12] Regional Data Centres in the FAO/UNU INFOODS network include the following: AFROFOODS, ASEANFOODS, CEECFOODS, EUROFOODS, LATINFOODS, MEFOODS, NEASIAFOODS, NORAMFOODS, OCEANIAFOODS, SAARCFOODS. In addition, there are several sub-regional Data Centres.

Composition and Analysis, promotes the importance of identifying and disseminating nutrient profiles of food plants and animals, including wild and under-utilized species and intra-specific data.

11. Absence of cultivar-specific food composition data has at times constituted a technical barrier to trade. Most potential export markets for unique species and cultivars require or encourage nutrient composition data for food labels (e.g. "Nutrition Facts" in the USA) and point-of-purchase materials. Many countries have experienced detentions and confiscations of products because compositional data required by the importing countries' legislation were not provided or were considered to be incorrect.

12. In many countries, voluntary or mandatory safety assessment schemes have been introduced for genetically modified organisms (GMOs) used as food. Such safety assessments usually use the concept of "substantial equivalence": the new food is compared to conventional foods to assess similarities and differences that may impact on the health of consumers[13]. Better knowledge on the nutritional composition of conventional foods (existing cultivars) will facilitate the conduct of safety assessments of GMOs[14],

13. The recommendations of the International Rice Commission's 20th Session[15] provided some important directions for food composition data generators and compilers. The International Rice Commission recommended that existing biodiversity of rice varieties and their nutritional composition needs to be explored before engaging in transgenic research; that nutrient content needs to be among the criteria used in cultivar promotion; and that cultivar-specific nutrient analysis and data dissemination should be undertaken systematically.

14. Knowledge of the nutrient composition of the native diet of endangered animal species is an important requirement for protecting them. In some countries, scientists have studied the nutrient composition of the original diets of birds in their native habitats, to ensure that the same nutrients in the same quantities were being supplied in the artificial diets on their offshore island sanctuaries and other protected, artificial habitats.

15. Climate change and other environmental phenomena affect the nutrient content of foods in many ways[16]. Ozone depletion has been shown to modify beta-carotene and other carotenoids and bioactive non-nutrients, while global warming has been shown to effect carbohydrate and fatty acid profiles[17]. The fat content of fish has been used as a marker in charting the climatic phenomenon of El Niño[18]. However, more data on diversity among genetic resources needs to be generated and documented before such changes related to climatic phenomenon can be elucidated.

16. FAO has reported that wild plants, animals, tree foods and forest foods are essential for many rural households[19]. At least one billion people are thought to use them. For instance, in Ghana, the leaves of over 300 species of wild plants and fruits are consumed. In rural Swaziland, wild plant foods provide a greater share of the diet than domesticated cultivars. In India, Malaysia and Thailand, about 150 wild plants have been identified as sources of emergency food. In developed countries, wild food plants also

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[13] The joint FAO/WHO Codex Alimentarius Commission adopted guidelines for the conduct of food safety assessments of GMOs and is pursuing its work in this area.
[14] OECD has been publishing a series of "consensus documents" on a number of food plants.
[15] FAO, 2002. Report of the International Rice Commission 20th Session (23–26 July 2002, Bangkok), FAO, Rome.
[16] USDA. Agricultural Research Service (2001). National Program, Global Change Annual Report: FY 2001.
[17] Seasonal variations of lipid fatty acids of boreal freshwater fish species. Comparative Biochemistry and Physiology B 88:905-909, 1987. Ågren, J., Muje, P., Hänninen, O., Herranen, J., Penttilä, I.
[18] Fat Content of Peruvian Anchovy (*Engraulis ringens*), After "El Niño" Phenomenon (1998—1999). Journal of Food Composition and Analysis, Volume 15, Issue 6, December 2002, Pages 627-631. María Estela Ayala Galdos, Miguel Albrecht-Ruiz, Alberto Salas Maldonado and Jesús Paredes Minga
[19] FAO, 1996. World Food Summit, Food for All. 13-17 November 1996. http://www.fao.org/documents/show_cdr.asp?url_file=/DOCREP/x0262e/x0262e04.htm

have an important place. In Italy, mushroom and forest-fruit gathering is popular, and throughout North America and Europe, wild foods feature on menus of the most fashionable restaurants.

17. Many wild plants have the potential to become foods of the future -- useful parents in breeding programs, convenient sources of income, and the vehicles for improved nutrition and increased food supply. Nutrient composition varies among wild plant ecotypes as well as crop cultivars. Some data have been generated, which mainly have been disseminated through specialised scientific publications.

18. Integrating biodiversity and nutrition can contribute to the achievement of Millennium Development Goal 1 (Target 2)[20], Goal 7[21] and related goals and targets, and thereby raise awareness of the importance of biodiversity, its conservation and sustainable use.

19. Through FAO/UNU INFOODS, in collaboration with other organizations, food composition courses are conducted for training in laboratory techniques and practices for generating data and computer systems for compiling data, although they do not always provide training at the cultivar-specific level.

20. Most countries have food control laboratories that undertake analyses for heavy metals, pesticide residues and other chemical contaminants. Some countries have established laboratories that can undertake both chemical food safety analyses and nutrient analyses, since sampling protocols, instruments, quality assurance and quality control systems are similar or identical. Thus, these combined food-control / food-composition laboratories are capable of efficiently generating cultivar-specific nutrient composition data and data on chemical contaminants.

21. Many developing countries and countries in transition are unable to devote resources to strengthening laboratory capabilities and are therefore not able to systematically undertake the nutrient analyses of individual cultivars. However, many countries and regions in the INFOODS network have developed small projects, generating, compiling and disseminating nutrient data on their plant biodiversity. Through FAO Technical Cooperation Projects, food composition activities have been funded to strengthen laboratory capability for nutrient analyses of indigenous species and varieties, to provide funds for sampling and analyses, and to prepare, print and disseminate food composition tables and databases. At a CEECFOODS[22] meeting held on 26 -27 July 2005, the member countries requested FAO's assistance in order for them to be able to generate more nutrient data on local cultivars and varieties and to mainstream those data by including them in national food composition tables and databases to ensure widespread availability.

4. RELATIVE PRIORITY OF OBTAINING CULTIVAR-SPECIFIC DIETARY CONSUMPTION DATA

22. In the past, as in the case of nutrient composition data described above, generic food consumption data were considered sufficient for most purposes, but increasingly, the usefulness of greater detail in dietary consumption, including cultivar-specific data and an ecosystem approach, is becoming acknowledged as important for understanding diet-related morbidity and mortality.

23. Agricultural production now provides enough food to supply the world with its dietary energy requirement, on a global basis. However, many millions of people with adequate, or even surplus, energy intake suffer from micronutrient deficiencies. A diet low in diversity is capable of providing adequate energy, but biodiversity should be utilized to provide the spectrum of micronutrients and other beneficial food components necessary for health.

24. A global epidemic of obesity and its associated diseases is emerging as increasingly urbanized people adopt diets which are higher in energy, and lower in diversity of fruits and vegetables than those consumed traditionally (this is known as "the nutrition transition"). Many countries now face the so called "double burden of malnutrition": the simultaneous challenges of high prevalence of undernourishment and underweight, and the increasing prevalence of overweight/obesity with its accompanying chronic diseases.

[20] See footnote 4 above.
[21] Ensure environmental sustainability.
[22] CEECFOODS is the INFOODS Regional Data Centre for Central and Eastern European Countries.

In both groups, high prevalence of micronutrient deficiencies is found. By underpinning dietary diversity, biodiversity has a particular role to play in addressing micronutrient deficiencies, and also the poverty- and urbanization-related problems of undernutrition and obesity, in both developed and developing countries.

25. Food consumption survey projects are undertaken, with representative sampling at the sub-national and/or national levels, in order to ascertain the adequacy of nutrient intakes. Current survey instruments and methods generally do not address cultivar-specific intakes, and thus prevent evaluation of this level of dietary biodiversity. However, recent studies have shown that survey respondents are capable of reporting intakes of species and varieties by local names[23].

26. As more cultivar-specific compositional data become available, the more important it becomes to modify the methods and instruments in order to capture cultivar-specific consumption in individual and household surveys. Knowledge of composition and consumption of intra-species diversity may be useful in the development of food-based dietary guidelines and nutrition education programmes for populations.

27. In summary, the absence of cultivar-specific composition and consumption data limits our ability to assess the value of these cultivars and their importance to individual, household and national food security, as well as to trade and the environment sector. Therefore, where detailed dietary consumption methods are used (e.g. weighed portions, 24 hour recall, diet histories), as opposed to methods that only record by food groups, clusters or generic food lists, then collection of cultivar-specific dietary consumption data is feasible and could be considered a high priority.

5. GUIDANCE REQUESTED FROM THE WORKING GROUP ON PLANT GENETIC RESOURCES

28. The Working Group may wish to consider recommending that the Commission request FAO to prepare a draft action plan to better support countries to generate, compile and disseminate cultivar-specific nutrient composition and consumption data. It would include the following activities:

a) assisting INFOODS Regional Data Centres in their efforts to increase the quality and quantity of food composition data on individual cultivars and under-utilized species, and to compile and disseminate those data in national and regional food composition tables and databases (see para.10);

b) enabling the *Journal of Food Composition and Analysis* to provide an international, peer-reviewed forum for publishing high quality scientific papers on nutrition and biodiversity, with particular attention to papers from developing countries (see para.10);

c) developing a biodiversity training module for courses on nutrient composition, focusing largely on developing sampling plans in order to generate cultivar-specific data (see para.19);

d) providing support for extending analytical capabilities and accreditation for nutrient analyses for existing food control chemical laboratory facilities, in order to more economically and efficiently generate cultivar-specific nutrient data (see paras.20-21);

e) increasing the coverage of FAO's Technical Cooperation Projects on national and regional food composition to strengthen laboratory capacity for nutrient analyses, in order to generate, compile and disseminate cultivar-specific nutrient data for national food composition databases and published food tables (see para. 21);

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[23] See for example "Field testing of plant genetic diversity indicators for nutrition surveys: rice-based diet of rural Bangladesh as a model". *Journal of Food Composition and Analysis, Volume 18, Issue 4, June 2005, Pages 255-268.* G. Kennedy, O. Islam, P. Eyzaguirre and S. Kennedy.

f) organizing national level sensitization, advocacy, and policy workshops in order for countries to appreciate undertaking such activities, thereby supporting them in their proposals for projects in the area of food composition and consumption, in the context of agricultural biodiversity, and publishing country-specific appropriate communication materials (see paras 24-25);

g) conducting an expert consultation or technical workshop on addressing biodiversity in consumption survey methodologies, including an ecosystem approach to population sample stratification (see paras 25-26); and

h) mainstreaming food composition biodiversity data into nutrition education, food security, emergency preparedness, community nutrition, indigenous knowledge and culture activities, and other applied nutrition projects and programmes.

29. The Working Group may wish to propose that the Commission be made aware of the progress of the ***Cross-cutting initiative on biodiversity for food and nutrition*** (IBFN) within the existing programme of work on agricultural biodiversity of the CBD, and in particular FAO's activities in this regard.

EXTRACT OF THE REPORT CGRFA-11/07/10

Report of the Third Session of the Intergovernmental Technical Working Group on Plant Genetic Resources

(See at http://www.fao.org/AG/cgrfa/cgrfa11.htm)

VI. SUPPORT FOR COUNTRIES TO GENERATE, COMPILE AND DISSEMINATE NUTRIENT COMPOSITION DATA OF PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

28. The Working Group considered the document Support for countries to generate, compile and disseminate cultivar-specific nutrient composition data, and the relative priority of obtaining cultivar-specific dietary consumption data,[8] and the associated information document, FAO activities in nutrition and biodiversity.[9] The Working Group noted FAO's long-standing activities in food composition and consumption in relation to agriculture, health, environment and trade.

29. The Working Group recommended that the Commission request FAO to prepare a draft action plan to better support countries to generate, compile and disseminate cultivar-specific nutrient composition and consumption data. The draft action plan should focus upon:

a) Generating baseline nutritional data for local, regional and/or specialty foods, from under-utilised crops, species utilised by local and indigenous communities, and wild food plants, taking into account local customs on food preparation. This work should be carried out consistent with national law. The species and target nutrients should be carefully chosen and sampling plans carefully formulated;

b) Cataloguing and compiling existing cultivar-specific nutrient data into more readily accessible databases or publications;

c) Identifying germplasm and generating experimental crop populations with very high and very low levels of "bioactive compounds" that may be useful for testing hypotheses about whether such compounds are nutrients, and whether they are "bioavailable" when consumed;

d) Assisting countries, in particular developing countries, to build capacity to enhance the use of nutritional genetic diversity in breeding new cultivars of major crops;

e) Assessing genetic resources in relation to nutrient uptake and bioavailability of nutrients, with a view to improved sustainable agriculture;

f) Assisting INFOODS Regional Data Centres in their efforts to increase the quality and quantity of food composition data on individual cultivars and under-utilized species, and to compile and disseminate those data in national and regional food composition tables and databases;

g) Enabling the Journal of Food Composition and Analysis to provide an international, peer-reviewed forum for publishing high quality scientific papers on nutrition and biodiversity, with particular attention to papers from developing countries; and

h) Developing communications plans for information on nutritional values of different cultivars at the national, regional and international levels.

[8] CGRFA/WG-PGR-3/05/5.

[9] CGRFA/WG-PGR-3/05/Inf.9.

30. The draft action plan could also include the following, lower priority, activities:

a) Developing a biodiversity training module on nutrient composition, focusing largely on developing sampling plans in order to generate cultivar-specific data, which should be complementary to existing training courses;

b) Providing support to, and building capacity of, existing food control chemical laboratory facilities, to enable them to more economically and efficiently generate cultivar-specific nutrient data;

c) Increasing the coverage of FAO's Technical Cooperation Projects to strengthening laboratory capacity for nutrient analyses, in order to generate, compile and disseminate cultivar-specific nutrient data for national food composition databases and published food tables, in particular for under-utilised crops and cultivars developed by local and indigenous communities;

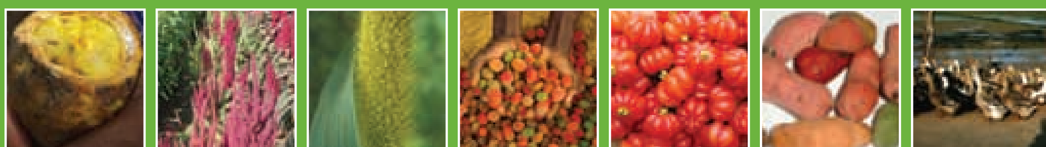
d) Organizing national level sensitization, advocacy, and policy workshops, thereby supporting countries in their proposals for projects in the area of food composition and consumption, in the context of agricultural biodiversity, and publishing country-specific communication materials;

e) Conducting an expert consultation or technical workshop on addressing biodiversity in consumption survey methodologies, including an ecosystem approach to population sample stratification; and

f) Mainstreaming food composition biodiversity data into nutrition education, food security, emergency preparedness, community nutrition, activities related to indigenous knowledge, and other applied nutrition projects and programmes, consistent with national law.

31. The Working Group considered that conducting broad-scale studies of cultivar-specific differences in nutrient content should have low priority, because of high costs, difficulties with logistics and feasibility, and in some cases, potentially limited scientific utility resulting from significant variation caused by environmental differences (during cultivation, storage, post-harvest processing) and by interactions between genotypes and environments.

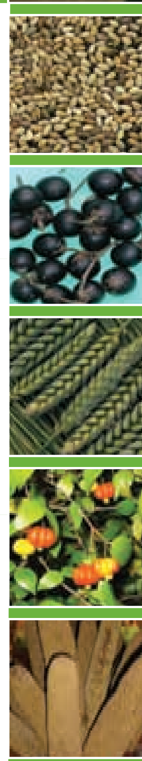
32. The Working Group proposed that the Commission should be kept aware of the development of the Cross-cutting initiative on biodiversity for food and nutrition that would be carried out within the existing programme of work on agricultural biodiversity of the Convention on Biological Diversity, and in particular of the activities of FAO and the CGIAR that could be important in this regard (such as the Bio-fortification Challenge Programme).



Biological diversity is the variety of life on Earth, from the simplest micro-organisms to complex ecosystems such as the rainforests of the Amazon. Biodiversity is important for nutrition and health, and can help to combat micronutrient deficiencies and other forms of malnutrition. This can only be done if the composition of foods is known and disseminated so that varieties and breeds with higher nutritional quality can be promoted.

The *Cross-cutting Initiative on Biodiversity for Food and Nutrition* has been established to measure, investigate and promote biodiversity and nutrition. Therefore, nutrition indicators need to be developed to address the three dimensions of biodiversity – ecosystems, the species they contain and the genetic diversity within species. The indicators will measure the food **composition and consumption** of cultivars, varieties, breeds and subspecies of commonly consumed foods, as well as of underutilized, uncultivated, indigenous plant and animal species.

The first nutrition indicator for biodiversity is related to food composition. It aims to report on progress regarding food composition for biodiversity and will help us value and preserve our planet's existing biodiversity within well-managed ecosystems, with their many sources of nutritionally-rich foods.



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