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para la  
Alimentación y la  
Agricultura

# COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

## Item 2.5 of the Provisional Agenda

### Fourteenth Regular Session

Rome, 15 – 19 April 2013

### REVIEW OF KEY ISSUES ON BIODIVERSITY AND NUTRITION

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## I. INTRODUCTION

1. At its Eleventh Regular Session, the Commission on Genetic Resources for Food and Agriculture (the Commission) recognized the important contribution of biodiversity to nutrition and recommended that existing information systems be progressively improved to include variety-specific nutrient composition and consumption data in the context of the Cross-cutting Initiative on Biodiversity for Food and Nutrition, in the Programme of Work on Agricultural Biodiversity of the Convention on Biological Diversity (CBD).<sup>1</sup> The linkages among biodiversity, food and nutrition and the need to enhance the sustainable use of biodiversity to combat hunger and malnutrition were recognized by the Conference of the Parties (COP) to the CBD, at its seventh meeting.<sup>2</sup> Subsequently, the eighth meeting of the COP adopted the framework for a Cross-Cutting Initiative on Biodiversity for Food and Nutrition, in which FAO was invited to take a lead role along with other partners.<sup>3</sup>

2. At its Thirteenth Regular Session, the Commission, through the adoption of its revised Multi-Year Programme of Work, requested FAO to review key issues in biodiversity and nutrition for consideration at its Fourteenth Regular Session. This document presents key nutrition issues related to food biodiversity<sup>4</sup> and seeks advice from the Commission on the prioritization of future work on biodiversity for food and nutrition.

## II. KEY ISSUES ON BIODIVERSITY AND NUTRITION

3. Global agricultural production is theoretically able to feed the world's population, yet 870 million people are hungry and 2 billion suffer from micronutrient deficiencies.<sup>5</sup> Furthermore, about 1.2 billion adults and children are overweight and 475 million are obese.<sup>6</sup> Many countries and agencies attempt to combat malnutrition with short-term health and nutrition interventions such as supplementation, Ready-To-Use Therapeutic Foods (RUTFs), fortification and sporadic health and nutrition policies and programmes. Not only are these interventions unsustainable, but in recent years, doubts have been articulated with respect to their efficacy.<sup>7</sup>

4. Food biodiversity (i.e. food identified at the taxonomic level below the species level, and neglected/underutilized or wild species) represents a nutrition resource that is capable of addressing the multiple burdens of malnutrition by providing dietary energy, macro- and micronutrients and other beneficial bioactive constituents. In general, well-managed agriculture and ecosystems in most parts of the world are capable of providing sustainable diets. There can be many reasons for differences in the nutrient content of food species, but among the most significant result from their genetic diversity.

5. The scientific literature reports significant intraspecific differences in the nutrient content of most plant-source foods (i.e. among the different varieties or cultivars of a given species). Significant nutrient content differences in meat and milk among breeds of the same animal species have also been documented. The differences are statistically significant, and more importantly, nutritionally significant, with up to 1 000-fold differences, and more, documented.<sup>8</sup> For example, consumption of

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<sup>1</sup> CGRFA-11/07/Report.

<sup>2</sup> CBD COP 7, Decision VII/32.

<sup>3</sup> CBD COP 8, Decision VIII/23.

<sup>4</sup> For the purpose of this document, food biodiversity is defined as food identified at the taxonomic level below species, and neglected/underutilized or wild species. Source: *Expert Consultation on Nutrition Indicators for Biodiversity 1. Food composition* (FAO and Bioversity International, 2008).

<sup>5</sup> FAO. 2012. *The State of Food Insecurity in the World*. 2012. Rome (available at <http://www.fao.org/docrep/016/i3027e/i3027e00.htm>).

<sup>6</sup> *Obesity the global epidemic* (available at <http://www.iaso.org/iotf/obesity/obesitytheglobalepidemic/> – accessed 23 December 2012).

<sup>7</sup> Latham, M. 2010. The great vitamin A fiasco *World Nutrition*, 1(1): 12-45 (available at <http://www.wphna.org/downloads/10-05%20WN%20commentary%20Latham.pdf>). WHO. 2003. *Diet, nutrition and the prevention of chronic diseases*. WHO Technical Report Series 916 (available at [http://www.who.int/nutrition/publications/obesity/WHO\\_TRS\\_916/en/index.html](http://www.who.int/nutrition/publications/obesity/WHO_TRS_916/en/index.html)).

<sup>8</sup> CGRFA-14/13/Inf 11.

200 g of rice per day can represent 25 percent, or more than 65 percent, of the Recommended Daily Intake (RDI) of protein, depending on the variety consumed. One banana can provide less than 1 percent or more than 200 percent of the RDI for vitamin A. Variety-specific differences can represent the difference between nutrient deficiencies and nutrient adequacy in populations and individuals.

6. At present, national consumption/dietary surveys on food biodiversity are very limited. Moreover, few food composition tables and databases include compositional data for food biodiversity below the species level. In order to properly address the linkages between biodiversity, food and nutrition, key issues that need to be addressed include the need to generate, compile and disseminate more nutrient composition data; the need to develop and administer food consumption/dietary assessment surveys that capture information on food biodiversity; and the need to characterize food systems and ecosystems for their ability to provide sustainable diets.

7. These data will create a base of reliable reference evidence that allows food biodiversity to be acknowledged and valued for its actual and potential role in reducing malnutrition, and can be used to inform decisions at appropriate levels and contribute to multisectoral policy instruments to support countries mainstreaming the sustainable use of biodiversity for the improvement of human nutrition in national food and nutrition action plans.

8. These data together will provide the information needed to improve the diets of individuals and populations, to bridge nutrient gaps sustainably with local food biodiversity instead of supplements, vitamin injections, fortificants and RUTF, and will contribute to food and nutrition goals and international initiatives including the Millennium Development Goals and the Zero Hunger Challenge.

#### **Characterization of different agro-ecological zones in relation to biodiversity and nutrition**

9. Agricultural programmes and policies often aim to increase the production of a few staple crops to eliminate hunger, and measure their success in terms of the quantity of available food or dietary energy supply. While some successes in reducing hunger have been achieved in some places, micronutrient malnutrition remains a persistent problem, with high prevalence in both developed and developing countries because staple crops do not provide sufficient micronutrient supplies.

10. Addressing the problem of micronutrient malnutrition through biofortification of staple crops will fail to address the problem effectively, because a healthy, balanced diet requires a variety of foods and nutrients, and not single micronutrient additions to starchy staples. It should be noted that some micronutrient deficiencies are easily measured (e.g. vitamin A and iron). However, these deficiencies need to be regarded as markers for deficiencies of 100 or more vitamins, minerals, individual amino acids and fatty acids, and other beneficial bioactive food components. Such deficiencies can only be avoided by consuming a variety of foods, not by, for example, biofortifying rice with a transgenic biosynthetic pathway for a pro-vitamin A carotenoid.<sup>9</sup>

11. Reducing malnutrition through sustainable production and consumption of selected varieties and breeds requires increased effort in the characterization of food systems in relation to biodiversity and to their specific nutritional values. Better evidence in this area will support the integration of biodiversity and nutrition elements in agricultural programmes and policies, improving food systems in line with the concept of sustainable diets. Sustainable diets are defined as diets with low environmental impacts that 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.

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<sup>9</sup> Greiner, T. 2012. Vitamin A wars: the downsides of donor-driven aid. *Independent Science News*, 24 Sept 2012 (available at <http://independentsciencenews.org/health/vitamin-a-wars-the-downsides-of-donor-driven-aid/>).

12. Food is defined in the Millennium Ecosystem Assessment as a provisioning ecosystem service. However, in the field of nutrition, food *per se*, is seldom dealt with independently of the nutrients it contains or the whole diet of which it is a part. FAO has proposed identifying nutrients and diets, as well as food, as ecosystem services, in order to further increase the recognition of nutrition as a concern for the environment sector, and *vice versa*, and assists in efforts to improve understanding of the concept of sustainable diets.<sup>10</sup>

13. As part of its work on sustainable diets, FAO has initiated studies in partnership with the Centre International de Hautes Études Agronomiques Méditerranéennes (CIHEAM), Biodiversity International and other partners, to develop methods and indicators for the characterization of different agro-ecological zones for sustainable diets, using the Mediterranean Diet as a testing model. These studies will serve to foster new ideas for building consensus on actions needed to link human nutrition with biodiversity, ecosystems and environmental impacts.

14. Participants at the International Scientific Symposium on Biodiversity and Sustainable Diets prepared a “Platform for Action”, asking FAO and partners to undertake seven activities,<sup>11</sup> which would, *inter alia*, promote and advance the concept of sustainable diets, and the role of biodiversity within it, in support of the implementation of the Cross-cutting Initiative on Biodiversity for Food and Nutrition and as a contribution to the achievement of the Millennium Development Goals and beyond.

15. Currently, two Global Environmental Facility projects on biodiversity and nutrition are coordinated by FAO, alone or in partnership with the United Nations Environment Programme and Biodiversity International. The projects aim to characterize diverse agro-ecological zones in Bolivia (Plurinational State of), Brazil, Kenya, Sri Lanka and Turkey to analyse and demonstrate the links among dietary diversity, nutritional benefits and local biodiversity for food and agriculture. The projects are being carried out in close cooperation with governments, scientists and local communities. Community-based mapping of agricultural landscapes (both on-farm and *in situ*) is undertaken to record and document the local biodiversity, including the variety of foods and their nutritional content; the associated traditional knowledge; the extent to which biodiversity is linked to diets; possible barriers to the current use of biodiversity; and opportunities for promoting the utilization of diverse foods. This information will add to the knowledge base on food consumption and food composition of local biodiversity. The projects will focus on the assessment of local biodiversity at selected pilot sites to determine the nutritional value of local animal and plant food species and varieties/breeds, and demonstrate that sustainable utilization of food biodiversity can contribute to improved dietary diversity and livelihoods.

### **Knowledge on biodiversity and nutrition**

16. The first step in promoting biodiversity in nutrition and agriculture is to expand the knowledge base on the nutritional benefits derived from biodiversity, i.e. from food identified at the taxonomic level below species, and neglected, underutilized or wild species. Accessible data would contribute to a wider recognition at all levels of the importance of food biodiversity for nutrition, sustainable diets, food security and environmental sustainability. Systematic analysis of nutrient data and food consumption survey data would contribute to strengthening national information system in food and agriculture and could help improve priority setting and national policy making. Such data will need to be increasingly available: for example, for nutrient intake estimation, nutrition education, food labelling and agricultural production. These data will also contribute to better nutrition, health and sustainable diets, while significantly diminishing the need for nutrient supplementation and fortification.

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<sup>10</sup> Global Forum on Food Security and Nutrition. 2013. *Hunger, food and nutrition security, toward a post-2015 development agenda* (available at <http://www.fao.org/fsnforum/post2015/re-e-consultation-hunger-food-and-nutrition-security-1929>).

<sup>11</sup> FAO 2012. *Biodiversity and sustainable diets: Directions and solutions for policy, research and action. Report: Technical Workshop – Biodiversity in Sustainable Diets, 3 May – 1 June 2010*. Rome.

17. FAO actively contributes to the knowledge base on biodiversity and nutrition through the development and regular updating of the FAO/INFOODS Food Composition Database for Biodiversity, through the monitoring of the Nutrition Indicators for Biodiversity and through the publication of guidelines and scientific articles, as well as through awareness raising at important international fora and conferences. The FAO/INFOODS Food Composition Database for Biodiversity is an easily accessible global repository of data on the nutrient content of food biodiversity.<sup>12</sup> It was launched in 2010 and is updated on a yearly basis. This database includes analytical data for different plant varieties/cultivars and animal breeds, as well as for underutilized and wild foods.

FAO/INFOODS currently contains nutrient values for over 6 300 food entries and 450 components (i.e. nutrients and bioactive non-nutrients) for potatoes, fruits, vegetables, fish and shellfish, insects, beef, milk, roots and tubers and, to a lesser extent, for cereals, nuts, seeds and legumes. The database is an essential tool in the promotion of the sustainable use of food biodiversity. FAO and INFOODS have developed several tools and guidelines, such as the *Guidelines for Food Matching* and the *Guidelines for Checking Food Composition Data prior to Publication of a User Database*,<sup>13</sup> with a special emphasis on food biodiversity. Other guidelines with emphasis on food biodiversity are foreseen, including guidelines on the incorporation of biodiversity into food consumption survey tools, on the incorporation of biodiversity into national or regional food composition tables, and on food sampling for chemical analysis.

18. Within the framework of the Biodiversity Indicators Partnership (BIP),<sup>14</sup> FAO and partners have developed two Nutrition Indicators for Biodiversity: one on food composition<sup>15</sup> and one on food consumption.<sup>16</sup> These indicators are used to assess the extent to which food biodiversity, including wild and underutilized foods that provide specific nutrients in different diets, has been explored. Even though, in 2011,<sup>17</sup> FAO reported 13 000 foods under the food composition indicator and 5 000 foods under the food consumption indicator, there is a significant data gap for both indicators.<sup>18</sup> Nevertheless, the indicators have proved useful in stimulating the production, collection and dissemination of biodiversity data for food composition and consumption. They are also good advocacy tools for raising awareness of the importance of biodiversity for nutrition.<sup>19</sup>

19. With a group of partners, FAO is also collaborating in the development of indicators and methods for characterizing sustainable diets, using the model of the Mediterranean diet and with biodiversity, traditional foods, and ecosystems as cornerstones. As part of this effort, a discussion paper was presented at the Ninth Meeting of the Ministers for Food, Agriculture and Fisheries of the member countries of the Mediterranean basin in September 2012.<sup>20</sup>

### **Mainstreaming biodiversity in national food and nutrition action plans**

20. Increased cooperation at all levels is needed in order to mainstream biodiversity into nutrition and agriculture, improve the diets and nutritional adequacy of populations and reduce all forms of malnutrition. Food biodiversity and nutrition should be mainstreamed into agricultural, nutritional and

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<sup>12</sup> See <http://www.fao.org/infoods/infoods/food-biodiversity/en/>.

<sup>13</sup> Standard guidelines can be downloaded from the FAO web site (<http://www.fao.org/infoods/infoods/standards-guidelines/en/>).

<sup>14</sup> A project coordinated by UNEP–WCMC, funded by the GEF, that assists in the development of biodiversity indicators.

<sup>15</sup> FAO. 2008. *Expert Consultation on Nutrition Indicators for Biodiversity 1. Food composition*. Rome.

<sup>16</sup> FAO. 2010. *Expert Consultation on Nutrition Indicators for Biodiversity 2. Food consumption*. Rome.

<sup>17</sup> FAO. 2013. *Nutrition indicators for biodiversity. Report on progress of data availability*. Rome (available at <http://www.fao.org/infoods/infoods/food-biodiversity/en/>).

<sup>18</sup> FAO. 2012. *Nutrition indicators for biodiversity. Report on progress of data availability*. Rome (available at <http://www.fao.org/infoods/infoods/food-biodiversity/en/>).

<sup>19</sup> CGRFA-14/13/4 provides further details on nutrition indicators for biodiversity.

<sup>20</sup> CIHEAM & FAO. 2012. *Towards the development of guidelines for improving the sustainability of diets and food consumption patterns in the Mediterranean area*. Rome (available at <http://www.fao.org/docrep/016/ap101e/ap101e.pdf>).

health-related policies and programmes. In the agricultural sector, food biodiversity should be taken into account in large-scale production systems and emphasis should be given to nutrition-driven agriculture.

21. At the global level, agricultural biodiversity is increasingly being recognized as an important issue on the international nutrition agenda. The United Nations Decade on Biodiversity serves to support and promote the implementation of the objectives of the Strategic Plan for Biodiversity and the Aichi Biodiversity Targets, with the goal of significantly reducing biodiversity loss at all levels. FAO and the Commission play a key role in the implementation of the Strategic Plan and in efforts to meet the targets that are of relevance to their work. These processes could also contribute to strengthening linkages between biodiversity, nutrition and agriculture. In addition, an increasing number of documents stressing the importance of linking biodiversity, agriculture and nutrition have recently been presented at high-level meetings, including at the Rio+20 Conference.<sup>21</sup>

22. In order to mainstream biodiversity and nutrition, some knowledge areas still need to be strengthened, such as how to take the nutrient contents of varieties or breeds into account in breeding programmes, how seed firms can take biodiversity and nutrition into consideration, and how to integrate biodiversity and nutrition into relevant sectoral policies at national, regional and international levels.

23. Development of guidelines for decision makers, along with capacity building, communication strategies and knowledge management, are key elements to mainstreaming biodiversity in nutrition and agriculture programmes and policies. These guidelines can address principles such as:

- Recognizing that the health of humans cannot be isolated from the health of ecosystems;
- Recognizing that the conservation and sustainable use of food biodiversity is an important part of human well-being;
- Considering that when ecosystems are not able to support sustainable diets there is a legitimate use for supplements, RUTF and fortificants; that all these products should accordingly be made accessible to those who need them through commercial or non-commercial distribution systems; and that they should not be marketed or distributed in ways that may interfere with sustainable diets;
- Recognizing further that when ecosystems are able to support sustainable diets, nutrition programmes, policies and interventions supporting the use of supplements, RUTF, fortificants and infant formulas are inappropriate and can lead to malnutrition, and that the marketing of these food substitutes and related products can contribute to major public health problems; and
- Appreciating that there are a number of social and economic factors affecting sustainable diets, and that, accordingly, governments should develop social support systems to protect, facilitate and encourage them, and that they should create an environment that fosters sustainable diets and provides appropriate family and community support and protection from factors that inhibit them.<sup>22</sup>

### III. GUIDANCE SOUGHT

24. The Commission may wish to:

- i. Acknowledge the progress made by FAO in raising awareness of the importance of biodiversity for nutrition and food security;

<sup>21</sup> FAO. 2012. *Towards the future we want: end hunger and make the transition to sustainable agricultural and food systems*. Rome (available at <http://www.fao.org/docrep/015/an894e/an894e00.pdf>). FAO. 2012. *Improving food systems for sustainable diets*. GEA Rio+20 Working Paper 4. Rome.

<sup>22</sup> FAO. 2011. *Final Report of the International Scientific Symposium on Biodiversity and Sustainable Diets, United Against Hunger*. Rome (available at <http://www.fao.org/ag/humannutrition/28506-0efe4aed57af34e2dbb8dc578d465df8b.pdf>).

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- ii. Encourage FAO to work further on sustainable diets, recognizing it as a useful concept and vehicle for linking food biodiversity and the environment sector to human nutrition; to continue playing its leading role in the Cross-cutting Initiative on Biodiversity for Food and Nutrition; to raise awareness among stakeholders of the important linkages between biodiversity and nutrition and of the concept that nutrients in food and whole diets, as well as food, should be explicitly regarded as ecosystem services;
  - iii. Encourage funding organizations to support research and interventions in key areas, including the characterization of ecosystems for sustainable diets, in order to demonstrate the role of biodiversity in food security and nutrition;
  - iv. Request FAO to continue to incorporate biodiversity and sustainable diets into relevant nutrition activities (e.g. food composition, food-based dietary guidelines, nutrition education, dietary assessment and nutrition policy development), and to further mainstream nutrition within its work on biodiversity;
  - v. Request FAO, upon availability of funds, to:
    - a. develop draft guidelines for mainstreaming biodiversity and sustainable diets into policies, programmes, and national and regional plans of action on nutrition, and request its Intergovernmental Technical Working Groups to review the draft guidelines and provide further advice for the Commission's consideration at its Fifteenth Regular Session;
    - b. continue updating the FAO/INFOODS Food Composition Database for Biodiversity on a regular basis;
    - c. undertake capacity development in INFOODS Regional Data Centres, to train responsible authorities in generating and compiling nutrient data for food biodiversity;
    - d. develop new survey methods and guidelines for modifying existing methods of dietary consumption in order to better capture information on the role of food biodiversity in food security and nutrition; and
    - e. assist countries already undertaking food consumption surveys in order to generate food consumption data for biodiversity on a regular basis.