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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

FAO'S ACTIVITIES IN NUTRITION AND BIODIVERSITY

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1. INTRODUCTION

1. FAO's work in nutrition has always included some aspect involving biodiversity. 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-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"*.[1] This document presents information on FAO's activities in nutrition and biodiversity, and complements the document prepared for the consideration of the Working Group, on *Support for Countries to Generate, Compile and Disseminate Cultivar-Specific Nutrient Composition Data, and the Relative Priority of Obtaining Cultivar-Specific Dietary Consumption Data*.[2]

2. FAO's current efforts involve collecting and examining the body of existing knowledge, and identifying knowledge gaps. Notwithstanding the gaps which need to be addressed, the body of existing knowledge is sufficient to warrant action to promote the use of biodiversity in food security and nutrition programmes, as steps towards the achievement of the Millennium Development Goals. In this regard, experiences with food composition, dietary assessment, home gardens, household food security, nutrition education, national plans of action for nutrition, food safety, and related projects of the Food and Nutrition Division of FAO provide some good examples of the close relationship between biodiversity and nutrition.

2. FAO'S EXPERIENCES RELATING NUTRITION AND BIODIVERSITY

Home garden projects

3. Home gardens are important micro-environments for *in situ* or on-farm conservation of a wide range of plant genetic resources. They provide essential sources of food, fodder, medicines, spices, construction materials and income for rural households in many countries around the world. The biodiversity found in such gardens provides households with access to a large variety of nutritious foods thus providing opportunities for better nutrition, food security and income[3].

Food composition and the International Network of Food Data Systems (INFOODS)

4. INFOODS, operated by FAO in collaboration with the United Nations University, has encouraged national food composition programmes and its Regional Data Centres[4] to generate, compile and disseminate compositional data on wild, indigenous, underutilized species and varieties, and to mainstream these data by incorporating them into their national food composition databases and printed food composition tables.

5. The most recently completed project involved the OCEANIAFOODS Regional Data Centre, which provided improved laboratory capability for nutrient analyses, funds for collecting and analysing some indigenous foods, and the preparation and publication of the Pacific Islands

[1] CGRFA-10/4/10.2 para.24
[2] CGFRA/WG-PGR-3/05/5
[3] Improving Nutrition through Home Gardening: A Training Package for Preparing Field Workers in Africa. FAO, Rome, 2001
[4] 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.

Food Composition Tables[5]. The introduction to these Tables states: "Traditional Pacific Island diets were diverse and nutritionally appropriate. In recent decades Pacific Islanders have experienced many changes in lifestyle and diet. Most of the dietary changes have not been for the better, and have contributed to the burden of malnutrition throughout the Pacific. *The vast natural biodiversity of food plants and animals represent an asset that is sadly neglected. Food composition activities provide a focus on the nutrient content of individual varieties, wild and cultivated, that will add to the impetus to preserve its rich diversity for the food security of the region* (our emphasis)**.** The food composition data presented in this document are fundamental to food trade, agriculture policy development, nutrition education, and the setting/achieving of nutrition goals and guidelines."

6. At the CEECFOODS[6] meeting held on 26 -27 July 2005, the member countries "requested FAO's assistance in strengthening laboratory capabilities in order to generate more and better food composition data on foods in their countries' food supplies, including wild and underutilized species and varieties, to compile and disseminate these data in order to contribute to achieving the Millennium Development Goals, provide an increased evidence base for the *Cross-cutting initiative on nutrition and biodiversity*, to more effectively address the double burden of malnutrition and to facilitate trade in export markets requiring nutrition information on food labels."

Dietary Assessment

7. 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 in 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. In both groups, high prevalence of micronutrient deficiencies is found.

8. FAO's Food and Nutrition Division is assessing the possibility of quantifying dietary diversity, linked with biodiversity, in its food consumption methodologies in order to address these diet-related problems. In collaboration with the Sokoine University of Agriculture in Tanzania, FAO recently conducted a small study of primary schools in the Kinondoni district of Dar es Salaam to assess the potential to improve the nutritional quality, particularly the micronutrient density of street foods sold to children. Many fruits and vegetables indigenous to Tanzania are rich sources of micronutrients, and thus the study incorporated questions on the use of indigenous foods by street food vendors. Initial findings indicated that many vendors knew some, if not all, of the indigenous fruits and vegetables listed in the questionnaire, but most of them did not use them in their businesses. The main barriers cited were seasonality and children's preference for other foods. A complete report of study results should be available later in 2005.

Journal of Food Composition and Analysis

9. The *Journal of Food Composition and Analysis*[7] is the official publication of INFOODS, and is co-sponsored by the United Nations University and FAO. Eight issues are published each year by Elsevier. This journal is devoted to all scientific aspects of the composition of human foods, with increasing emphasis on the nutrient, bioactive non-nutrient and antinutrient content of plant and animal genetic resources.

Rice Projects

[5] Dignan, C.A.; Burlingame, B.A.; Kumar, S.; Aalbersberg, W. (2004). *The Pacific Islands Food Composition Tables, 2nd edition.* INFOODS, University of the South Pacific, FAO. Rome.
[6] CEECFOODS is the INFOODS Regional Data Centre for Central and Eastern European Countries.
[7] http://ees.elsevier.com/jfca/

10. FAO's Food and Nutrition Division worked in collaboration with the FAO Secretariat for the International Rice Commission on several rice-related projects including an analysis of food composition data on rice from a plant genetic resources perspective and a special issue of the *Journal of Food Composition and Analysis* on the International Year of Rice. Nutrition presentations at the International Rice Commission's 20th Session led to the following recommendations:

a. existing biodiversity of rice varieties and their nutritional composition need to be explored before engaging in transgenics;
b. nutrient content needs to be among the criteria in cultivar promotion; and
c. cultivar-specific nutrient analysis and data dissemination should be systematically undertaken.

3. PROJECTS SUPPORTED BY FAO'S REGIONAL OFFICES

FAO Regional Office for Asia and the Pacific

A. FAO Case Studies: Indigenous People's Food Systems

11. The Food and Nutrition Division of FAO (Rome) and the FAO Regional Office for Asia and the Pacific (Bangkok), in collaboration with the Centre for Indigenous People's Nutrition and Environment (CINE), defined the method for documenting indigenous people's food resources and the long term goal of using these resources for programme planning to ensure adequate diets and good nutritional status[8]. Documentation from five case studies in Asia[9] has identified species to be analyzed. Some qualitative and quantitative data are also being analyzed to evaluate the potential of the local food system for improving nutritional (micronutrient) status. Some of the case studies are on-going in collaboration with a Global Health Research Project, CINE, and McGill University, Canada.

B. Projects in Lao People's Democratic Republic (Lao PDR)

Home Garden Models in Lao PDR: Links with Agro-Biodiversity and Food Security:

12. During 2002-2004, FAO's Regional Office for Asia and the Pacific provided technical assistance to the Government of Lao PDR in developing innovative home garden models that integrated agricultural production with nutrition awareness[10]. The results demonstrated that rural integrated home gardens can serve to: (a) increase food production with optimum use of available area; (b) diversify food production; and (c) increase food supply and availability and meet the food and nutritional needs of household members. The pilot project was implemented in four selected villages of Central Laos and developed models for household nutrition garden production which included horticulture (variety of vegetables and fruits, including indigenous plants), small livestock and aquaculture production in combination with nutrition education.

13. More than 25 different species of fruits and vegetables were found in the home gardens before the project started, some of which were local varieties. During the project, additional local varieties were recommended, and farmers were provided with vegetable seeds and fruit saplings. Twenty-three different varieties of vegetables were identified and promoted for their important nutritional qualities, as well as fifteen varieties of fruit and nine types of forest food, including underexploited indigenous fruits and nuts. After one year of project implementation, not only had the area for vegetable production increased, but the types of vegetables had also become more varied. Before the project started, only 23% of the households were growing these vegetables in their gardens, but after completion of the project, the percentage reached 75%. As a result of the

[8] Kuhnlein HV. Micronutrient nutrition and traditional food systems of indigenous peoples. Food, Nutrition and Agriculture 2003; 32: 33-37.
[9] Bangladesh, China, India (Dalit AP, and Bhil Tribes, Gujarat), Thailand.
[10] Bhattacharjee L, Phithiyaphone S and Nandi BK 2004. Report of the Pilot Project on the Promotion of Home Gardens for Improved Nutritional Well-being TCP/LAO/2902, FAO and Department of Agriculture (DOA), Ministry of Agriculture and Forestry (MAF).

increased production and access to a larger variety of vegetable crops in the participating villages, the average daily production of vegetables reached 245 grams per person, compared to the current national per capita daily availability of 64.3 grams.

14. Nutrition education and food preparation activities were closely linked with the food production component. Food preparation demonstrations were offered to the target households to increase the number and type of foods used in daily meals. This programme managed to improve nutritional practices in a relatively short time. Generally, households only consumed leafy vegetables one to three times per week or less before the project, and similar patterns were noted with the consumption of fruit, fish, eggs and meat. After 15 months the frequency of leafy vegetables had increased to one to three times per day. Infant and young child feeding practices were also monitored to address the serious problem of under-nourishment among children under five. After six months of regular growth monitoring, combined with nutrition education, anthropometric measurements showed the prevalence of underweight children was declining. The final measurements in July 2004 recorded a rate of 15.6%, down from 23.2% at the baseline (April 2003). For underweight children 24-35 months old, the prevalence dropped from 33.3% to 5.6% post intervention.

15. Inter-sectoral collaboration (agriculture, health and education, Lao Women's Union) fostered by the project at district and provincial levels could effectively replicate the home gardens on a broader scale. With input of seeds, fruit tree saplings, fish and frogs, and small livestock, plus nutrition education, home gardens are a cost-effective method of promoting food security and nutrition at household and community levels in poor remote areas of the Lao PDR. While the project has contributed to enhancing agro-biodiversity and conserving local varieties of fruits and vegetables, this promotion of diversified production needs to be further strengthened.

National Agricultural Biodiversity Programme and Home Gardens in Lao PDR:

16. A comprehensive National Agricultural Biodiversity Programme was developed by FAO, UNDP and NAFRI as a framework and long-term strategy for implementing a coordinated approach to better use, development and conservation of agricultural biodiversity[11]. One of the programme's five thematic components is 'household based integrated agriculture production systems', which the development of home gardens can supply. This component includes three main outputs:

a. a*ssessment of the impact of household-based integrated agriculture production systems (home gardens) on sustainable livelihoods of people*. The FAO home garden project has already documented the benefits of home gardens on nutrition and improved food security on a small scale;
b. *identification and documentation of indigenous foods and community food systems and their contributions to micronutrients and nutrition in general.* So far there is limited documentation of the nutritional value of indigenous foods;
c. expansion and improvement of household-based integrated agriculture production systems in target households to increase the amount and variety of nutritious foods, e.g. fruits, vegetables, small animals, fish and other aquatic resources. This includes training household members and agricultural staff at all levels in household-based integrated agriculture production systems and harvest and post-harvest processing. It also includes provision of seeds, small animals, fish and garden tools and assistance in marketing; and
d. *improved understanding of nutrition*, Planned activities include assessing household awareness of nutritional needs, training extension staff in understanding nutritional needs and developing nutrition education materials. Training in nutrition

[11] FAO. 2004. *National Agricultural Biodiversity Programme in Lao PDR.*

management and food preparation is also planned for families, while enhanced awareness of nutrition needs and gaps is needed among policy makers.

C. Projects in Sri Lanka

Promoting Food Diversity through Assistance for Internally Displaced Person (IDP) Affected Communities in Northeast Sri Lanka:

17. The nutrition component of project OSRO/SRL/402/EC provided synergy to the home gardening programme of the project "Emergency assistance for the rehabilitation of agri-based livelihoods of recently resettled IDP families in the districts of Kilinochi, Mullaitivu and Trincomalee, North East Province, Sri Lanka", creating nutrition awareness for promoting the consumption of an adequate quantity and variety of foods to meet dietary nutrient (micronutrients) needs, especially among mothers and children under five years. The project showed that home gardens can make significant contributions to food security and promote dietary diversity for nutrition/micronutrient improvement of displaced rural households. The project concept and methodologies for replication needs to be expanded to other IDP villages in the North East.

Promoting Food Diversity in Tsunami Affected Vulnerable Communities in Northeast Sri Lanka:

18. Under the post-tsunami assistance programme for Sri Lanka, specific strategies, activities and measures for reconstruction and development of the fisheries and agriculture sectors are being implemented. The nutrition component is being dovetailed with these strategies with the aim of contributing to the recovery and resettlement of the affected populations in ways that promote sustainable food security, nutrition and livelihoods.

19. Diversified/integrated food production is being promoted to help to meet seasonal food shortfalls, support nutrient gaps, develop resilience during emergency situations and also provide some income. The use of a variety of biologically diverse crops and local varieties of vegetables such as *Moringa oleifera*, wild fruits, and variety of local green leafy vegetables, yellow fruits, cereal, millets and nuts (including coconut) is being demonstrated through the Nutrition Education Programme.

D. Projects in Bangladesh

FAO UNDP –GoB Integrated Horticulture and Nutrition Development Project, Bangladesh (2000 -2005):

20. The overall development objective of the project is to improve the efficiency of the horticultural system and associated support services through use of modern technologies, ensuring food security and nutrition in 15 districts of Bangladesh. Central to this is the project's efforts towards creating an environment of food production for consumption and equipping the rural farmers with the necessary knowledge, technology and skills to prepare nutritious foods using a diverse variety of horticulture crops/foods that can be consumed by themselves and their households thereby improving dietary quality. Specifically, the nutrition education component of the project has been promoting biodiversity for nutrition through training, demonstrations and transfer of technologies in guiding and assisting farmer households/especially women farmers as well as adolescent school girls to diversify their food habits and promote the consumption of horticultural crops as a sustainable solution to the problem of malnutrition (micronutrient malnutrition).

21. The project covered areas serve as a repository of biodiversity promoting several important horticultural crops, e.g. jackfruit, citrus, banana/plantain, the wide range of gourds, country bean, as well as local leafy vegetables etc. for food security and nutrition improvement. The project directly targets 22,000 poor farmer households covering 15 districts in the country. As part of its programme of germplasm introduction and distribution the project has looked at particular selections/landraces of local horticultural crops for propagation, multiplication and wider dispersal across the country. For example early maturing cultivars of country bean,

superior selections of ginger, introduction of clonal propagation techniques for jackfruit allow perpetuation of superior local germplasm. The biodiversity imparted by the horticulture crops through the project is seen to be playing a pivotal role in sustaining and strengthening food, nutrition, health and livelihood security of the poor farmers covered by the project.

E. Projects in India

FAO Case Studies: Bhil Case Study[12]*, Gujarat, Western India:*

22. An assessment of the community food system showed that the Bhil use a variety of plants (leafy vegetables, roots, fruits, mushrooms) domestic animals, small animals and local fish varieties with methods of preparation and processing unique to the culture. Ninety-seven commonly consumed foods have been identified to compose the Bhil traditional food list. Out of 78 traditional food species, 23 were taken during the monsoons and included six varieties of fish and five types of green leafy vegetables. Sixteen foods were consumed during summer and few traditional foods except grains were taken during winter. Most fruits, especially mango, were favored during summer, along with green leafy vegetables (i.e. cowpea leaves) and meats such as that of deer. Wild roots and tubers were gathered from the jungle and twenty food species were taken throughout the year.

23. These results point to the need for strategic community based interventions that would help to improve food security, nutrition and health of the Bhils. There is a need to demonstrate and quantify the benefits of the diversity of Bhil foods for livelihoods and to ensure that information gathered is put to use widely to increase their well being. The more effective use of such diversity can also serve to be a more sustainable and environmentally friendly solution to the problems of food production. Understanding the unique local species and varieties of food often requires new identification, food analysis and dietary assessment methods that are appropriate to the community context in which they are applied. Acquiring nutrient data and intake data for food species and varieties is essential in order to understand the impact of biodiversity on food security.

International Consultation on UN Millennium Development Goals - Five years later: Agricultural Biodiversity and Elimination of Hunger and Poverty:

24. An FAO Nutrition Consultant for the Regional Office for Asia and the Pacific participated in and provided inputs on nutrition at this International Consultation held at the M.S. Swaminathan Research Foundation in Chennai, India, on 18 and 19 April 2005 on behalf of the Food and Nutrition Division, FAO. About 100 experts and policy makers with varied backgrounds from 25 countries took part in the Consultation. The main task of the Consultation was to consider how agricultural biodiversity can help the world to achieve the Millennium Development Goals, and in particular the goal of freedom from hunger and poverty. This was jointly organized by the M.S. Swaminathan Research Foundation, the International Plant Genetic Resources Institute and the Global Facility for Under-utilized Crops, in cooperation with the Swiss Agency for Development and Cooperation, the Canadian International Development Agency, the International Fund for Agricultural Development, the Ford Foundation and the Syngenta Foundation for Sustainable Agriculture. Nutrition inputs were provided in the Consultation and nutrition considerations were reflected in its outputs.

25. Taking cognizance of these unique strengths of agricultural biodiversity, the participants of the International Consultation adopted the Chennai Platform for Action for a Hunger and Poverty Free World. The Platform for Action is designed to assist national governments and

[12] Bhattacharjee L, Kothari G, Ramswamy V, Kuhnlein HV and Nandi BK, Traditional food patterns and dietary intake of Bhil tribes in the Dang district of Gujarat, Western India in: Proceedings of the FAO Symposium on Measurement and Assessment of Food Deprivation and Undernutrition, Rome ; 2003 : 259-260.

international agencies to achieve as soon as possible the UN Millenium Development Goal relating to halving hunger and poverty by 2015.

26. Three nutrition related recommendations were incorporated and emerged as part of the Chennai Action Platform:

- "Agree to incorporate agricultural biodiversity in the implementation of existing global policy tools, such as Food-Based Dietary Guidelines and the WHO/FAO Global Strategy for Diet, Physical Activity and Health."
- " Advocate and strengthen national nutrition literacy through participatory knowledge management involving all societal segments, particularly women and young people, and train agricultural extension workers and health and nutrition professionals in the importance of dietary diversity and evidence-based beneficial effects of traditional foods to re-establish the relevance of regional agricultural biodiversity in fighting hunger and poverty".
- "Ensure that food and nutrition support safety net programmes, especially food aid and school feeding programmes as well as food banks, are fostering greater dietary diversity by broadening the food basket with more indigenous crops as part of National Nutritional Policy".

FAO's Regional Office for Latin America and the Caribbean

27. The Regional Office for Latin America and the Caribbean supported and organized several activities such as meetings, workshops and publications to promote the consumption of indigenous crops, and this has been also supported by research and information-gathering about the nutritional characteristics and agricultural applications of these crops.

A. Meetings and workshops

28. The Regional Office sponsored or participated in the following meetings and workshops involving nutrition and biodiversity:

a. Meeting on underexploited Andean crops of nutritional value, at Santiago, Chile, 7-10 October, 1986. General discussion was focused on possible actions to be taken for the diffusion of knowledge and experiences of the region's scientists on strategic food as quinua (*Chenopodium quinoa*), qañiwa (*Chenopodium pallidicaule*), oca (*Oxalis tuberosa*) and olluco (*Ullucus tuberosus*) among others that have been domesticated in the high mountains of Andes;
b. Meeting on indigenous crops with nutritional value in Mesoamerica, held at Guatemala City, Guatemala on 2-5 October, 1989;
c. Workshop on utilization of underexploited Andean crops in food and nutrition, Quito, Ecuador in 1990; and
d. Technical meeting and workshop on regional project formulation regarding production and human nutrition based on Andean cultures, Arequipa, Peru, 20-24 July, 1998.

B. Publications

29. The Regional Office issued the following publications related to nutrition and biodiversity:

a. "Cultivos andinos subexplotados y su aporte a la alimentación." (Underexploited Andean crops and their contribution to food). This publication includes scientific and practical knowledge of Andean crops, agronomy, nutrition and agro-industry [*].

[*] These publications are available at:
http://www.rlc.fao.org/prior/segalim/prodalim/prodveg/cdrom/indice_gral.htm

b. "Cultivos autóctonos subexplotados con valor nutricional de Mesoamérica" (Underexploited indigenous crops of Mesoamerica with nutritional value). This publication is a compilation of presentations on the current and potential status of these crops, presented by the participants from each country in 1989. Its objective is to promote the production and consumption of indigenous crops.

c. "Valor nutritivo y usos en alimentación humana de algunos cultivos autóctonos subexplotados de Mesoamérica" (Nutritional value and use for human food of some underexploited indigenous crops of Mesoamerica) *.

d. "Manual sobre utilización de cultivos andinos subexplotados en la alimentación" (Manual on underexploited Andean crops used as food". The purpose of this book is to call attention to the importance of these crops for food safety at the home level and includes recipes using these crops *.

e. "Memorias de la reunión técnica y taller de formulación de proyecto regional sobre producción y nutrición human en base a cultivos andinos" (Proceedings of the technical meeting and workshop on regional project formulation regarding production and human nutrition based on Andean crops). These proceedings contain the presentations of participants to the meeting mentioned above (item d), as well as projects elaborated by researchers at the workshop *.

f. "Platos típicos de América Latina, 1998" (Traditional Latin American dishes). This publication contains a compilation of recipes and chemical composition of traditional Latin American dishes, many of which contain products of indigenous cultures from Argentina, Brazil, Chile, Colombia, Ecuador, México, Paraguay, Peru, Uruguay and Venezuela, based on the information received from the participants to the CTPD workshop on Production and handling of food chemical composition data in Latin America, that took place at Chile in 1995. It is available at http://www.rlc.fao.org/prior/segalim/accalim/10050.htm.

C. Latin-American Food Composition Tables

30. The UN and FAO have supported the activities of LATINFOODS, the Latin American organization affiliated to INFOODS, involved in the generation and compilation of data on food composition, through the implementation of workshops, specific courses, symposia analyzing the present situation and future plans of action. One of the concrete actions has been the edition of the Food Composition Table of Latin America (2002).

31. The Latin America region is privileged with native foods which represent an important source of nutrients, some of which have been included in the composition tables such as quinua, oca and olluco[13].

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[13] See www.rlc.fao.org/bases/alimento/default.htm

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