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GCARD Sub-Session P2.1: Sustainable Use of Biodiversity Briefing Paper

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Context – the problems being addressed

Agricultural biodiversity is a resource the world can no longer afford to ignore. Agriculture is being pushed to the very boundaries of sustainability and ecosystems are under extreme pressure. Nearly 1 billion people worldwide are undernourished, billions more suffer from micronutrient deficiencies and 70% of the world's poorest 1.4 billion people depend on small-scale farms for their food. And this is against a backdrop of increasing obesity and nutrition related chronic diseases such as diabetes and heart disease. While modern agriculture has increased yields, this has often come at a price of diets lacking in diversity and quality. Moreover it is projected that by the year 2050, the world would need to produce 70% more food for its increased populations and their rising demands, and do so sustainably – taking climate change into account. The increased demand for animal source foods will further increase price volatility and place pressure on the diets of the poor and the environmental costs of food production. Agriculture will need to adapt faster during the next 40 years than it has over its entire 12,000 year history. Agricultural biodiversity is a key and principal ingredient necessary for this adaptation in agriculture and for provision of ecosystem services. Sustainable diets are needed to ensure the food system has a limited environmental cost while being nutritionally adequate, economically accessible and culturally appropriate.

The problems being addressed in this session are related to ensuring global food and nutrition security, as well as promoting resilience in production systems and delivering ecosystem services through agricultural biodiversity. The CBD defines agricultural biodiversity as “all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agro-ecosystem. It includes the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes.”¹. Whole landscape management approaches therefore embody biodiversity management, use and conservation across landscapes and ecosystems, while also harbouring biodiversity at species and intra-species dimensions.

Current activities to be presented and discussed in the session

Agricultural systems are complex and for proper functioning they rely not only on the biodiversity of agriculturally used areas but also on the services of biota from the wider agricultural environment (e.g. pollinators, crop wild relatives). Broadly speaking, agricultural biodiversity can be subdivided in two major categories. The first category consists of the genetic resources for food and agriculture (GRFA) that provide food and other essential components harvested or collected products from domesticated crops, crop wild relatives (CWR), domesticated animals (including fish and other managed aquatic animals), fungal and microbial genetic resources (the latter particularly for post-harvest processes). The second category comprises all those non-harvested components that contribute to, and sustain, agricultural productivity by provisioning supporting and regulating ecosystem services. The most significant organisms of this category of agricultural biodiversity include soil micro-biota, pollinators and the antagonists of pest and diseases.

Presentations in this session will cover elements of sustainable use of agricultural biodiversity in these two categories, and provide some roadmap for future work in sustainable management and use of the resource. Some of the attributes that will be explored relate to the following areas of benefits of agricultural biodiversity:

- It is a main source of traits for breeding and crop and animal commodity improvement.
- It is a major and direct contributor to nutrition and health in its direct use, enabling dietary diversity and sustainable diets

¹ COP V/5 Appendix, paragraph 1

- It contributes to the resilience and stability of agricultural production systems;
- Provides control mechanisms against pests, mycotoxins and diseases;
- Provides a vital resource for soil health and vitality;
- Offers genetic security for adaptation to threats like climate change; and
- Offers economic and social opportunities that contribute to livelihoods and maintenance of cultural and social values including for women engaged in agrobiodiversity activities

Given the complexity of agricultural biodiversity and the holistic nature required for its sustainable management and use, partnerships and multi-sectoral mechanisms and approaches are essential.

Presentations will highlight how this is being addressed in a number of initiatives, such as a CGIAR Consortium strategy implemented through the CGIAR Research Programs (CRPs), the International Treaty on PGRFA, the WANA Network of AARINENA; The Suwon Agrobiodiversity Framework of APAARI; the Orphan Crops Initiative of WWF, DuPont and Mars; and the Diversity for Development initiative of GFAR.

Intended outcomes

The intended outcomes are:

1. Specific actions identified for strengthening partnerships within the respective initiatives.
2. Workplans outlined for agrobiodiversity joint action and partnership research over the coming two years.
3. Major opportunities for integrating agrobiodiversity into broader sustainable development goals identified
4. Strategies for enhancing collaboration identified and agreed.
5. Strengthened gender engagement.
6. Funding mechanisms explored for future work.

Commitments to collective actions in 2012-2014 (national, regional or international)

i. With existing resources

A. Through the CRPs of the CGIAR system: The various CRPs all have components of work planned on agricultural biodiversity. An analysis of agro-biodiversity in the current portfolio showed that CRPs are highly uneven in their inclusion of agro-biodiversity conservation and use research, partly consequence of carrying on large content of pre-CRP on-going bilateral projects. The portfolio does not show clear linkages between CRPs on agro-biodiversity research, missing a great opportunity of across CRPs learning. The CRP portfolio will highly benefit from the development and implementation of a system level strategy, including synergies and interactions between *in situ* and *ex situ* activities.

Some key dimensions of agricultural biodiversity research in some CRPs are indicated below:

- a. CRP 1s (Focusing on Agricultural Production Systems in 3 separate agro-ecological zones – CRPs)
 - i. Reducing vulnerability and managing risk in smallholder agriculture
 - ii. Sustainable intensification for more productive, profitable and diversified production
- b. CRP 3s (Sustainable Staple Food Productivity Increase in 7 separate commodities - CRPs)
 - i. Conserving and accessing genetic resources; managing gene bank collections
 - ii. Accelerating development & selection of varieties with higher, more stable yield and added value; breeding, biotechnology.
- c. CRP 4 – Agriculture for Improved Nutrition and Health; explores agricultural biodiversity for nutrition and health
 - i. To enhance dietary diversity and quality foods in food and nutrition security
 - ii. Use of neglected and minor species in diets for nutrition
 - iii. To ensure the nutritional resilience of food and ecosystems; “Sustainable Diets”
- d. CRP 5 – Water, Land and Ecosystems
 - i. Below-ground biodiversity and agroforestry improves soil health and nutrient cycling
 - ii. Biotic diversity regulates pests and disease and reduces ecosystem vulnerability
 - iii. Biodiversity to improve ecosystem functioning (wild-cultivated interface) and resilience of production systems
- e. CRP 6 – Trees, Forests and Agroforestry
 - i. Management and conservation of forest and tree genetic resources
 - ii. Understanding threats to important tree species and their genetic diversity;
 - iii. Improving access to and facilitating use of high quality germplasm of priority tree sps.
- f. CRP 7 – Climate Change, Agriculture and Food Security:
Genetic diversity is key for adaptation to climate change.
 - i. Strategies for addressing projected abiotic and biotic stresses induced by future climate

change.

ii. Use of genetic diversity to enhance adaptation and resilience to climate change.

B. A number of regional initiatives and networks of agricultural biodiversity aim to support country R&D action in agricultural biodiversity research, management and use for food and nutrition security, and also as part of resilience building in production systems and ecosystems. Examples of such initiatives that are committed for action during 2012-2014 are:

- a. The Suwon Agrobiodiversity Framework of APAARI
- b. The Agricultural Biodiversity Initiative (ABIA) of FARA
- c. The WANA Network of AARINENA

C. Other initiatives addressing aspects of agricultural biodiversity:

- a. The International Treaty on Plant Genetic Resources for Food and Agriculture
- b. The Commission on Genetic Resources for Food and Agriculture, FAO
- c. Orphan Crops Initiative,
- d. Crops for the Future initiative,
- e. Diversity for Development initiative of GFAR
- f. Microbial Diversity and Sustainability program
- g. Pollinators Initiative

ii. With additional support

The CRPs and all the programs and initiatives listed above need to continue over the next 5 year phase, and would require financial support. This will result in increased research outcomes, such as from following:

- Sustainable use of biodiversity in smallholder systems for reducing vulnerability and managing risk; including combinations of institutional, biophysical and management options
- Enhanced use of agro biodiversity to improve smallholders food and nutrition security and mitigate the negative aspects of dietary transition towards low nutrient, high energy, processed foods
- Sustainable intensification options designed and developed, involving the use of broader range of diversity in crops and livestock systems
- Enhanced availability, access and benefit sharing of genetic resources involving countries, with clear evidence of improved use and benefits in both agriculture and environment
- Use of a diversified range of crops and livestock in breeding and biotechnology systems resulting in enhanced food and nutrition security in developing countries and globally.
- Stronger partnerships and collaboration across countries, including through regional initiatives such as the Suwon Agrobiodiversity Framework, the Agricultural Biodiversity Initiative for Africa (ABIA), and the WANA Network of AARINENA.

iii. With specific large scale programme investment

The CRPs and all the programs and initiatives listed above will require large scale program investment to scale out successful initiatives and link research to development outcomes. Some of the expected domains for scaling:

- More diversity available in smallholder systems. Options for reducing vulnerability and mitigating risk through sustainable use of biodiversity in agriculture scaled up and out within regions
- Effective use of biodiversity in agriculture and in nutrition (dietary diversity) scaled up and out, especially in developing countries, with appropriate links developed to markets and to private sector.
- Sustainable intensification with biodiversity options out-scaled
- Strengthened gender involvement in the use of of biodiversity in agriculture for impact on consumption and livelihoods
- Sustainable conservation efforts gaining ground in several dimensions. This includes the development of an innovative operational global programme of in situ conservation on farms and in the wild, of agricultural and forest biodiversity, including crop wild relatives.
- Systems in place for long term conservation of key crops, and for other domains of agricultural biodiversity: including microbials, pollinators, livestock and other essential components.
- Partnerships along the impact pathway supported for the realization of impacts in the various domains of sustainable use and conservation of biodiversity for livelihood, food and nutrition security and environmental resilience in production systems and livelihoods.