

Summary Report of the FAO International Symposium
“The Role of Agricultural Biotechnologies in Sustainable Food Systems and Nutrition”
15 to 17 February 2016 at FAO Headquarters, Rome

I. Objectives and Organization

The objective of the symposium¹ was to explore the application of biotechnologies for the benefit of family farmers in developing sustainable food systems and improving nutrition in the context of unprecedented challenges, including climate change. As underlined by the FAO Director-General José Graziano da Silva in his welcome address to the symposium²: “*We must count on a broad portfolio of tools and approaches to eradicate hunger, fight every form of malnutrition and achieve sustainable agriculture in the context of climate change*”.

The symposium used a broad definition for biotechnology derived from article 2 of the Convention on Biological Diversity³ and took a multisectoral approach, covering the crop, livestock, forestry and fishery sectors, and the use of microorganisms within these sectors. It focused on agricultural biotechnologies and products that are currently available and ready for use by small-scale producers and family farmers. It covered low- and high-tech applications, such as microbial fermentation processes, biofertilizers, biopesticides, artificial insemination, tissue culture and the use of molecular markers for genetic improvement (so-called ‘marker-assisted selection’). It also included genetic modification, used to make genetically modified organisms (GMOs).

An external Advisory Panel⁴ of 16 internationally recognized experts and stakeholders, including representatives from the private sector and the civil society, provided advice and guidance to FAO in organizing the symposium.

There were over 400 participants including 230 delegates from 75 member countries and the European Union, as well as representatives of intergovernmental organizations, private sector entities, civil society organizations, academia/research organizations and producer organizations/cooperatives. This included 63 invited speakers, chairs and moderators.

II. Highlights of the Symposium

The programme included an opening plenary session, a high-level ministerial session, a student session and nine parallel sessions organized around three main themes: *climate change; sustainable food systems and nutrition; and people, policies, institutions and communities*.

The FAO Director-General opened the symposium, followed by keynote addresses delivered by Prof. Louise Fresco (President, Executive Board of Wageningen University), Prof. Gebisa Ejeta (Distinguished Professor, Purdue University and 2009 World Food Prize Laureate), Dr. Pedro Machado on behalf of Dr. Maurício Lopes (President, Empresa Brasileira de Pesquisa Agropecuária) and Prof. Gunter Pauli (Founder, Zero Emissions Research and Initiatives Network)⁵.

A ‘*high-level ministerial session*’ (HLS) included statements from eight countries (Argentina, Bangladesh, Cameroon, Canada, Hungary, Senegal, the Netherlands and the United States of America). The statements focussed on the policies and/or major programmes/investments in these countries relevant to the application of agricultural biotechnologies.

¹ Symposium website is at <http://www.fao.org/about/meetings/agribiotechs-symposium/en/>

² <http://www.fao.org/about/who-we-are/director-gen/faodg-statements/detail/en/c/383121/>

³ It states that biotechnology is “any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use”

⁴ <http://www.fao.org/about/meetings/agribiotechs-symposium/advisory-panel/en/>

⁵ The video recording of this and all other sessions of the symposium can be watched at <http://www.fao.org/about/meetings/agribiotechs-symposium/webcasting/en/>

Common issues that emerged included: appreciation for FAO's role as a neutral forum in this area; the value of FAO disseminating science-based knowledge; the need for capacity development, both at the individual and the institutional level; the importance of countries having good regulatory frameworks, legislation and policies; and the centrality of the farmers themselves, because of the knowledge they bring and because they are the end users of biotechnologies or their products on the farm. Different participants in the HLS also referred to the need to explore and enhance understanding of the linkages between agroecology and agricultural biotechnologies. They also proposed that the dialogue initiated during the symposium be continued at the regional level.

An *interactive 'student session'* enabled the international student community to provide their perspectives and inputs to the symposium. Students from seven universities around the world (Colombia, Ghana, Indonesia, Italy, Lebanon, the Netherlands and the United States of America) followed the key symposium sessions through 'webinars'. They then engaged in a moderated discussion via video conferencing with a panel consisting of the FAO Deputy Director-General, Ms. Maria Helena Semedo; Chair of the CGIAR Independent Science and Partnership Council, Prof. Maggie Gill; and Profs. Gebisa Ejeta, Louise Fresco and Gunter Pauli.

Students requested policy-makers to (i) engage the student community in the dialogue and the decision-making processes; (ii) integrate and link biotechnology better with other topics and issues related to food and agriculture; (iii) encourage participation of farmers and inclusion of smallholders in the policy process to be able to transfer the biotechnologies for their needs.

The *nine parallel sessions* organized around the three main themes formed the core of the symposium.

On '*climate change*', presentations showed how applications of both low- and high-tech approaches can help producers, particularly family farmers and small-scale producers, in the different sectors to be more resilient and to better adapt to climate change. For example, about four million small farmers in South Asia currently grow rice varieties tolerant to complete flooding (submergence) developed using DNA marker-assisted selection. The positive role that biotechnologies could play in mitigation was shown, however it was noted that in some cases farmers might lack economic incentives to use technologies that reduce the release of greenhouse gases. These sessions also underlined the importance of agricultural biodiversity for climate change adaptation and mitigation.

On '*sustainable food systems and nutrition*', case studies showed that a wide range of biotechnologies are being used to enhance resource use efficiency, add value in the post-production part of the value chain and increase the safety of food. For example, biocontrol products containing native non-toxic strains of fungi are used by smallholders in Kenya and Nigeria to reduce contamination of maize by aflatoxins (toxic metabolites produced by a common fungus). This makes the maize safer for use as food or feed, and increases the farmer's incomes. More research is needed on how to improve nutrition, particularly for fruits and vegetables. The importance of context was underlined, and the need to ensure that technologies are matched to the needs of different situations. The importance of consumer acceptability of new products was highlighted as was the need for communication and dialogue, from an early stage and with multiple stakeholders. These sessions also noted the potential of new gene editing technologies, such as CRISPR-Cas9.

On '*people, policies, institutions and communities*', the key elements for an 'enabling environment' for the development and application of agricultural biotechnologies were discussed. The importance of accumulating evidence through assessments of the social, economic and environmental impacts of biotechnologies on smallholder and family farming systems was underlined. There was a rich exchange of experiences and viewpoints on policies, regulation and intellectual property rights related to the application of biotechnologies, including perspectives from the private sector and civil society. Participants acknowledged that most developing countries needed to strengthen their institutional, regulatory and legal frameworks on the use of biotechnologies. The need for capacity development

and partnerships of all types (including public-private, South-South, North-South, West-East and triangular) in the adoption of agricultural biotechnologies was a common theme.

External stakeholders organized five *side events* related to the main themes of the symposium

The key points that emerged from the parallel sessions on the three main themes and from the student session were presented during the *final plenary session*. Prof. Louise Fresco also presented an overall summary of the main points emerging from the symposium, and the FAO Director-General closed the symposium⁶.

III. Outcomes and Key Messages

The symposium successfully broadened the discussions beyond the narrow and polarised debate on genetically modified organisms (GMOs) which is hindering the development and use of the full range of biotechnologies. Biotechnology is much more than GMOs. Discussion about agricultural biotechnology needs to encompass the full range of low- and high-tech non-GMO biotechnologies that are available or will be in the near future.

The symposium highlighted numerous examples of the successful application of agricultural biotechnologies that meet the needs of family farmers in the crop, forestry, fishery and livestock sectors. The enormous potential of new gene editing technologies was acknowledged and the need to follow closely advancements in this area agreed.

FAO successfully reinforced its role as a neutral forum by bringing together stakeholders from widely diverse backgrounds to engage in a discussion of agricultural biotechnologies in an open and constructive dialogue. In his closing statement, the FAO Director-General underlined that “*FAO is very proud to have fulfilled its role as a neutral forum for frank and open dialogue among all stakeholders*”. While there is controversy because consensus is lacking on some issues in this dialogue, he emphasized that: “*FAO will not shy away from any issue that is relevant to our mandate of ending hunger and improving nutrition, as well as promoting a shift towards sustainable agriculture development.*”

Agricultural biotechnologies and agroecology should be seen as complementary approaches to attaining sustainable food systems and improving nutrition. For example, biotechnologies and their products can be used in production systems, based on agroecological principles, to enhance productivity while ensuring sustainability, conservation of genetic resources and use of indigenous knowledge.

Participants highlighted the important contribution of agricultural biotechnologies to achieving the Sustainable Development Goals (SDGs) and to meeting challenges such as climate change that may prevent member countries from attaining sustainable food systems and improved nutrition. In working to address these challenges all available approaches and every possible solution, including agroecology and agricultural biotechnologies, should be considered.

The FAO Director-General recalled in his closing statement: “*tools and approaches must be useful and accessible for farmers, in particular family farmers*”. Agricultural biotechnologies cannot be considered in isolation, their successful development and application for the benefit of smallholders and family farmers requires well-functioning research institutions, rural advisory services, markets, farmer organizations and other components of the wider agricultural innovation system.

There are concerns about intellectual property rights and patents related to agricultural biotechnologies and their implications with respect to the development of sustainable food systems and nutrition.

⁶ <http://www.fao.org/about/who-we-are/director-gen/faodg-statements/detail/en/c/383717/>

The importance of building awareness and communication on agricultural biotechnologies was a common theme throughout the symposium as was the view that all stakeholders, including smallholders and family farmers, should be engaged in this process.

The engagement of students in the symposium was successful and was considered especially important, as they will be the future farmers and leaders.

Way forward:

- Communication and awareness raising efforts on agricultural biotechnologies need to be increased to widely disseminate outcomes and key messages.
- The technical knowledge exchange and dialogue on agricultural biotechnologies needs to be brought to the regional level.
- Explore mechanisms and initiatives to strengthen support to member countries in capacity and institutional development and application of agricultural biotechnologies including in such areas as developing regulatory frameworks and enabling policies for the application of biotechnologies.