



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

Продовольственная и
сельскохозяйственная организация
Объединенных Наций

Organización de las
Naciones Unidas para la
Alimentación y la Agricultura

منظمة
الغذية والزراعة
للأمم المتحدة

E

FAO REGIONAL CONFERENCE FOR AFRICA

Thirtieth Session

Khartoum, the Sudan, 19-23 February 2018

Outcomes of the FAO Regional Meeting on Agricultural Biotechnologies in Sustainable Food Systems and Nutrition in Sub-Saharan Africa

Executive Summary

The FAO Regional Meeting on Agricultural Biotechnologies in Sustainable Food Systems and Nutrition in Sub-Saharan Africa took place from 22 to 24 November 2017, at the African Union Conference Centre in Addis Ababa, Ethiopia.

The meeting was hosted and co-organized by the Government of Ethiopia, through its Ministry of Agriculture and National Resources Development, and co-sponsored by the African Union Commission. Its main objective was to bring the dialogue and exchange of knowledge and experiences regarding biotechnologies to a regional level, using a multisectoral approach.

The meeting was attended by about 160 participants from 37 Sub-Saharan countries, including representatives of research and academic institutions, private sector bodies, farmer organizations and civil society organizations, as well as representatives nominated by 28 governments in the region.

The meeting defined a series of recommendations grouped under five main areas: Capacity, Policy, Enabling Environment, Communication and Partnership. The background, outcomes, key messages and recommendations of the regional meeting are summarized in this Information Note.

*This document can be accessed using the Quick Response Code on this page;
an FAO initiative to minimize its environmental impact and promote greener communications.
Other documents can be consulted at www.fao.org*



ARC30

I. Background

1. Science and technology can play a substantial role to overcome the effects of climate change and other challenges that prevent countries from achieving food security, sustainable food systems and nutrition. The technologies available to smallholder farmers should be as broad as possible, including but not limited to agroecology and biotechnologies¹.

2. From 15 to 17 February 2016, FAO held the International Symposium “*The Role of Agricultural Biotechnologies in Sustainable Food Systems and Nutrition*”² at FAO headquarters, Rome. The main objective of the symposium 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.

3. The symposium highlighted the important contribution that agricultural biotechnologies can make in achieving the Sustainable Development Goals and also provided numerous examples where both low- and high-tech biotechnologies are being applied to meet the needs of small-scale producers and family farmers. The symposium successfully broadened the discussions beyond the narrow and polarized debate on genetically modified organisms. It reinforced FAO’s role as a neutral forum that can bring together stakeholders from different backgrounds for a frank, open and constructive dialogue and exchange of knowledge on a controversial topic.

4. The FAO Regional Meeting on Agricultural Biotechnologies in Sustainable Food Systems and Nutrition in Sub-Saharan Africa was therefore a follow-up of the Rome symposium, aiming at bringing the global debate to a regional perspective. The meeting was held from 22 to 24 November 2017, at the African Union Conference Centre in Addis Ababa, Ethiopia. It was hosted and co-organized by the Government of Ethiopia and co-sponsored by the African Union Commission. His Excellency Eyasu Abraha, Minister for Agriculture and Natural Resources Development, Ethiopia; The Honourable Mahen Kumar Seeruttun, Minister for Agro-Industry and Food Security, Mauritius; Her Excellency Josefa Leonel Correia Sacko, Commissioner for Rural Economy and Agriculture, African Union Commission; and Mr Ren Wang, FAO Assistant Director-General, Agriculture and Consumer Protection Department, participated in the opening part of the meeting.

5. The main objective of the regional meeting was to bring the dialogue and exchange of knowledge and experiences regarding biotechnologies to a regional level, using a multisectoral approach (crop, livestock, forestry and fisheries/aquaculture sectors). It also aimed to cover the wide spectrum of available biotechnologies, from low- to high-tech, including microbial food fermentation, tissue culture in crops or trees, reproductive technologies in livestock, DNA-based kits to diagnose diseases in farmed fish, use of molecular markers, genetic modification and other biotechnologies³.

¹ Based on the definition of ‘biotechnology’ in Article 2 of the Convention on Biological Diversity (i.e. “any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use”) the term ‘agricultural biotechnologies’ encompasses a broad range of technologies used in food and agriculture for a number of different purposes, such as the genetic improvement of plant varieties and animal populations to increase their yields or efficiency; the characterization and conservation of genetic resources for food and agriculture; plant or animal disease diagnosis; and vaccine development. For an overview of the wide range of biotechnologies involved, see <http://www.fao.org/biotech/biotech-forum/conference-16/en/>

² The International Symposium website is at <http://www.fao.org/about/meetings/agribiotechs-symposium/en/>. The proceedings are at <http://www.fao.org/documents/card/en/c/66e9a36c-19b2-407a-83c9-5b767e233417/>. A 4-page summary report of the symposium is available at <http://www.fao.org/3/a-bl623e.pdf>

³ Further details on the background, scope, focus, expected outputs etc. for the meeting are available in the FAQs document produced for the meeting, at <http://www.fao.org/africa/events/detail-events/en/c/1035227/>

6. The regional meeting⁴ took place over two and a half days. The first half day consisted of the opening session and a high-level segment while the next one and a half days consisted of eight parallel sessions and two plenary sessions. The last half day consisted of reporting from these 10 sessions; a plenary session on 'the way ahead'; and the closing session.

7. The process for developing the programmes for the plenary and parallel sessions involved an FAO Task Force, responsible for the development and delivery of the regional meeting, and a 14-member external Advisory Panel⁵ of internationally recognized experts and stakeholders, providing advice and guidance to the Task Force. The programmes for the different sessions were developed through a participatory process where the Advisory Panel played a central role.

8. About 160 people participated in the meeting, coming from 41 different countries: 37 in the Sub-Saharan region and four from outside. This included representatives nominated by 28 governments in the region plus representatives of civil society organizations (CSOs), research/academic institutions, farmer organizations/cooperatives and private sector bodies. It also included 49 invited speakers and chairs, almost all from Africa, coming from academia/research organizations (29); intergovernmental organizations (8); government (4), private sector (3), CSOs (4) and farmer organizations (1). Some participants played more than one role (e.g. the representative from a farmer organization was a speaker in two sessions and Chair of a third).

II. Outcomes and recommendations from the plenary and parallel sessions

9. The plenary session on "*The state of application, capacities and the enabling environment for agricultural biotechnologies in Sub-Saharan Africa*" had the following key messages:

- a) Countries in Sub-Saharan Africa have different levels of capacity, enabling environments and application regarding the development and use of agricultural technologies, which can increase food production, food safety and environmental protection. However, countries have to build the capacities of their personnel and increase financial resources to realize the full potential of these biotechnologies and tackle other challenges related to their use in agriculture, such as lack of infrastructure and inadequate or inappropriate policies.
- b) Biotechnology interventions should essentially target smallholder farmers. Getting related information, technology, improved breeds, strains and cultivars, and capacity delivered to farmers is key. This can be done through the use of existing national agricultural research systems (NARS) and farmer field testing of biotechnologies, which has worked well in some areas for delivery and could be duplicated elsewhere.
- c) It is important to collect and distribute to all stakeholders accurate information on the advantages and risk/benefits of agricultural biotechnologies. This will avoid misinformation and misconceptions about environmental and human health safety with regards to the use of biotechnology products.
- d) Since the public sector cannot be expected to fund all necessary biotechnology research and development, it is vital to establish partnerships – including with the private sector – to reduce costs and to facilitate the development and uptake of biotechnologies. The latter could be further facilitated by building the capacity of groups of countries with similar conditions and priorities.
- e) Furthermore, the private sector and farmer groups should be included in the research and development phases of agricultural biotechnologies to ensure appropriate and sustained product development for eventual commercialization by the private sector.

⁴ The final agenda, as well as the abstracts and Power Points presentations made, are available on the meeting website – at <http://www.fao.org/africa/events/detail-events/en/c/1035227/>. In addition, video recordings of presentations should be available on the FAO website in the near future

⁵ The Advisory Panel members are presented in http://www.fao.org/fileadmin/user_upload/raf/uploads/Advisory_Panel.pdf

10. The plenary session on "***The role of agricultural biotechnologies in addressing the food security and nutrition challenges in the region***" had the following key messages:

- a) Despite the ongoing development of biotechnology in many African countries, the adoption rate is still very low due to different obstacles. There is a need to find new ways to move forward and increase adoption of biotechnologies, considering the concerns of farmers and other stakeholders. Therefore, governments need to be convinced about technology's role and adoption in addressing food and nutrition challenges in the region. In addition, biotechnology research and extension is still very weak at country level and has to be improved mainly by training researchers to target and overcome the bottlenecks in agriculture.
- b) Communication and awareness at different levels are critical to avoid misconception and ensure wide dissemination. Clear messages on the role and use of biotechnology in agriculture have to be developed, improved and communicated through proper channels.
- c) Agricultural biotechnology development should be addressed across the value chain and should consider end user needs, farmers' and other stakeholders' concerns at the centre of any efforts. It is also critical to identify and understand the barriers related to the development and adoption of biotechnology approaches and products, with respect to the environmental benefits.
- d) It is important that governments and their financial partners consistently invest in research and development and ensure that biotechnologies respond to local, national and global needs. Therefore, brokering between research organizations and donors is key.
- e) It is crucial to strengthen the focus on the horticulture sector given the importance of fresh fruits and vegetables for achieving healthy diets and preventing micronutrient deficiencies and diet-related non-communicable diseases.

11. In the parallel session on "***Biotechnologies for the characterization, conservation and sustainable use of genetic resources for food and agriculture***" issues raised by participants were that:

- a) Africa is rich in biodiversity and genetic resources for food and agriculture. For instance, in terms of crop genetic resources, the world's major diversity includes the Ethiopian highlands (centre of origin for coffee, sorghum, lentil, wheat and barley), the Sahelian transition zone, the delta of the Niger River, tropical West Africa (centre of origin for African rice, oil palm, yams and cowpeas), etc. However, the full potential of these resources has not been realized in any sector and biotechnologies can help realize this potential.
- b) Biotechnologies have a role to play in developing and using 'orphan crops' and countries should take the lead in developing these crops based on their specific needs and priorities.
- c) It is favourable to develop and domesticate native species for aquaculture through biotechnologies over the introduction of non-native species.
- d) A programmatic approach to the research and development of biotechnologies in aquaculture was recommended, including elements of genetic improvement of farmed fish, feed and disease. Linkages with other sectors, disciplines and agencies were also recommended to be part of the programmatic approach.
- e) A communication strategy and raising public awareness is required for small-scale farmers and aquaculturists to fully understand the benefits and risks of using biotechnologies in agriculture and aquaculture. Introduction of simple or 'low-tech' biotechnologies could be a first step in awareness raising.
- f) Consumers can be key sources of information regarding how to design biotechnological improvements of a commodity to ensure good marketability.
- g) Although countries wish to see wider use of biotechnologies, the cost associated with their development and uptake is still a key problem and needs to be addressed.

- h) Capacity in bioinformatics, inter alia, is a key bottleneck in the development and use of biotechnologies. Africa should either have the capacity to work in such areas or develop partnerships for certain aspects (e.g. gene sequencing).

12. The parallel session on "**Capacity, knowledge and reaching farmers regarding agricultural biotechnologies**" had the following recommendations:

- a) African governments should increase training of scientists and extension workers to drive information dissemination to farmers.
- b) The needs of youth – for high profit margin endeavours– should spur the targeted dissemination of information on products of biotechnologies.
- c) Need to integrate facts into the decision-making process to ensure that they are evidence-based and strengthen the capacities of stakeholders along the value chain.
- d) Agricultural policies need to be reviewed to ensure that they reflect the needs of women and youth.
- e) Dissemination of scientific and accurate information about products of biotechnologies will enhance the understanding of farmers and policy-makers.
- f) Establish technology and information delivery systems.
- g) Build the capacity for agricultural biotechnology research to generate, adapt and access biotechnology innovations and for extension workers to be able to monitor and relate the right information to the farmers.
- h) Training of Trainers for increased public awareness.
- i) Strengthen the capacity for public-private partnerships (PPPs) and the mechanisms of technology transfer.

13. The parallel session on "**Improving productivity and resource use efficiency using biotechnologies**" had the following recommendations:

- a) Develop targeted incentives and formulate policies to attract the private sector.
- b) Biotechnology products should be disseminated as part of comprehensive packages and should be accompanied with the safeguarding of farmer-preferred products in gene banks.
- c) Genetic improvement objectives should go beyond yield enhancements to improvements in quality attributes, which drive end users' preferences for varieties and breeds, and should also focus on minor crops, such as pulses, which enhance nutrition and are part of the food systems of the rural poor.
- d) Interventions should target all components of the value chain with a focus on micronutrient conservation at all levels. Indeed, nutrition must be incorporated into all aspects of the value chain – starting with nutrient-rich soils that will improve the quality of the crops, and extending across the food system to other elements such as food safety, food processing, food fortification and proper food preparation and consumption in households.
- e) Networking – nationally, regionally and globally – enhances the exchange of information and peer support for skills acquisition.
- f) In order to enhance learning amongst countries, a central regional biotechnologies laboratory should be established. Ideally, partnerships should be strengthened between countries and existing laboratories (the CGIAR System Organization, NARS) to benefit and cater to all countries.

14. Key points of discussion in the parallel session on "**Food safety, post-harvest and agro-processing: The role of biotechnologies**" included:

- a) Biotechnologies such as metagenomics assist in studying the entire genetic information relating to microbial organisms in food (cases of milk and pork meat were presented). However, they complement and do not replace conventional microbiological methods which are still valid tools to confirm compliance to food safety standards.

- b) The use of the biocontrol product Aflasafe in maize and groundnut production may add to the improvement of health and nutrition of people as it can lower the amount of aflatoxins, a toxic substance known to be related to diseases such as liver cancer. It is important to monitor the lowering of the body burden of aflatoxins in affected areas through the establishment of specialized research groups in collaboration with medical research.
- c) Need for assessment of food losses and food wastage and identify the role of biotechnology as a tool to aid in solution of these problems.
- d) Biotechnology cannot be a stand-alone tool. It has to be integrated with other practices.

15. The parallel session on "*Biotechnologies to enable smallholders to adapt to climate change*" had some key points:

- a) Research organizations (e.g. CGIAR centres) are developing climate resilient crops in Sub-Saharan Africa through the integration of novel biotechnology tools. It is important that NARS request and use the improved genetic material in their breeding programmes to release climate resilient varieties that can be directly used by smallholder farmers.
- b) Climate change is associated with disease outbreaks in some important fish species (e.g. Epizootic Ulcerative Syndrome [EUS] in Southern Africa) and there is a need to invest in adequate infrastructure that will enable sensitive, rapid and reliable diagnosis. It is crucial as a means of disease prevention and control and to enable aquaculture growth.
- c) Research results from studying a food and medicinal tree widespread in the West African savannahs highlight that, faced with the threats of climate change, prioritization should be given to preservation of tree populations with low genetic diversity and to use of populations with high diversity for breeding and dissemination of genetic materials.
- d) The need to develop customized interventions, that may involve regional and global collaborations, for small island African states on account of their peculiarities – flooding, drought, salinization of soils, rising sea levels, etc. – which impact negatively on crops, livestock and aquatic resources.

16. The parallel session on "*Resourcing for agriculture and agricultural biotechnologies*" had the following conclusions and recommendations:

- a) National governments should implement the Maputo Declaration commitment of allocating at least 10 percent of their national budgets to agriculture and rural development policy implementation.
- b) Private investment should be promoted in agricultural value chains by maintaining a predictable policy environment and investments should be increased in agricultural adaptive research and extension to close the gap on research and development (R&D) and transfer agricultural technologies to communities.
- c) Smallholders (who effectively are part of the private sector) should come together and raise their voices to influence government decisions.
- d) Governments must take the lead in developing the agenda for the development of agricultural biotechnologies by allocating resources (human and infrastructure).
- e) There is need for governments to ensure that there are functional regulatory systems to adopt technologies and make science-based decisions on new technologies as well as a proper policy environment for PPPs to commercialize new technologies.
- f) Funding needs to be found for capacity building of farmers and extensionists.
- g) A mechanism needs to be developed to help Sub-Saharan African countries to learn from each other about successes and failures of biotechnology research and development, for example how to incentivise private sector investment in agricultural research.
- h) Mandate FAO and the African Union Commission to track progress on the implementation of a commitment made by African countries in 2006 to invest at least one percent of their Gross Domestic Product (GDP) in R&D.

17. The parallel session on "***Public-private partnerships and South-South Cooperation involving biotechnologies***" had the following outcomes and recommendations:

- a) Available technologies should be identified and utilized to enhance agricultural productivity through PPPs and South-South Cooperation (SSC).
- b) PPPs can be a platform for sharing costs and risks, and for facilitating technology and information dissemination.
- c) Partnerships, including North-South cooperation, can involve research, capacity building, cost-sharing, sharing of equipment and laboratories. Mechanisms for cost-recovery and cost-sharing between private and public entities should be explored.
- d) New research and training partnership models, such as the one presented involving North-South and South-South Cooperation involving two French research institutes (the Institute of Research for Development [IRD] and the Agricultural Research Centre for International Development [CIRAD]) and the NARS in Burkina Faso, Mali, the Niger and Senegal, can also be considered for other subregions.
- e) PPPs should benefit local communities by building local capacity, involving local communities and promoting the development of local companies.
- f) The terms of PPPs should be well established and intellectual property rights (IPR) clearly identified to avoid the intellectual property-related issues, with respect to germplasm exchange and access to data.
- g) Efforts should be made to ensure that collection and storage of genetic material that is not covered under the FAO International Treaty on Plant Genetic Resources for Food and Agriculture, e.g. some orphan crops, will benefit local farmers and the private sector.

18. In discussions in the parallel session on "***Governance, policy and regulatory processes regarding agricultural biotechnologies***" the following key issues were pointed out:

- a) Regulatory systems are important and key to stimulate economic development, food safety and environment protection.
- b) Regulation must be facilitating not disempowering and should not be a barrier to economic trade and activities of farmers.
- c) Such regulation must encourage partnerships and networks for effective exchange of information and managing biotechnology.
- d) Communication and awareness to enable inclusiveness is key.
- e) Regional harmonization is a key element.
- f) There needs to be strategic advice on a comprehensive set of laws.
- g) There needs to be a special workshop dedicated to discussing governance, regulation and IPR in agriculture biotechnology.

III. Key recommendations

19. On the concluding day, the Chairs of the ten preceding plenary and parallel sessions presented the outcomes from their respective sessions, based on which the main common recommendations were grouped under five 'clusters' and discussed individually in 'the way ahead' plenary session. The recommendations were subsequently adjusted to reflect the discussions held.

20. The revised set of recommendations from the regional meeting are as follows:

- a) **Capacity**
 - i) Strengthen the capacities of individual researchers and research institutions, extension services, farmer organizations and all other actors along the value chain to develop, disseminate and adopt agricultural biotechnologies for their needs.

b) Policy

- i) Governments should develop policies and procedures for the appropriate use and regulation of biotechnologies, covering also intellectual property management.
- ii) The African Union and FAO should support further programmes/initiatives in this area.

c) Enabling Environment

- i) Enable the development and application of agriculture biotechnologies in the crop, livestock, forestry and fisheries sectors.
- ii) Increase national investments in agricultural biotechnologies.
- iii) Monitor commitments made by countries in support of biotechnologies.

d) Communication

- i) Strengthen networking and information dissemination amongst all relevant partners regarding agricultural biotechnologies, including researchers, farmers, policy-makers, consumers and extension workers, and using appropriate communication tools (e.g. local languages).
- ii) FAO should contribute to the documentation of success stories of application of agricultural biotechnologies.
- iii) Engage farmers and consumers from the beginning in the process of developing products of agricultural biotechnologies.

e) Partnership

- i) Foster, strengthen and support the building of all partnerships regarding agricultural biotechnologies, including international, regional, subregional, South-South, public-private and bilateral partnerships.