



Food and Agriculture Organization
of the United Nations

Proceedings of the FAO International Symposium on the Role of Agricultural Biotechnologies in Sustainable Food Systems and Nutrition





Chapter 7

Side events: Reports



7.1 Delivering nutrition, productivity and climate resilience – The Africa Biofortified Sorghum project

This side event was moderated by Dr Margaret Zeigler, Executive Director of the Global Harvest Initiative, and other panelists included Mr Daniel Kamanga, Director for the Communication Program, Africa Harvest, and Dr Firoz Amijee, Head of Global Registration & Regulatory Affairs, DuPont Pioneer. The Africa Biofortified Sorghum (ABS) project partners are DuPont Pioneer, Africa Harvest, the Kenya Agriculture and Livestock Research Organization (KALRO) and the Institute of Agricultural Research (Nigeria). Additional partners throughout the life cycle of the project include the Nigeria National Biotechnology Development Agency (NABDA), the University of Pretoria, the University of California Berkeley, the Agricultural Research Council (ARC) South Africa, ICRISAT, INERA (Burkina Faso), the Bill and Melinda Gates Foundation and the Howard G. Buffett Foundation.

The panelists presented for approximately 40 minutes about the ABS project, which is a multistakeholder initiative to fight malnutrition in one of the most food-insecure regions of the world. The presenters discussed the increased nutritional stunting of children in Africa: zinc deficiency is prevalent in 50 percent of children and anaemia (in part due to lack of iron) is prevalent in between 40 to 60 percent of all children under five. Vitamin A deficiency is the leading cause of preventable blindness in children and the rate of prevalence across Africa is 32 percent. An estimated 57 million children in Africa are stunted from lack of micronutrients and sufficient nutrition.

Sorghum is a critical food grain for many of the world's most food-insecure people and is uniquely adapted to Africa's climate. The ABS project is focused on improving the nutritional profile of sorghum, while also building research capacity and strengthening seed systems. Biofortified sorghum has the potential to deliver 50 to 100 percent of vitamin A requirements for extended periods of time after sorghum harvest and up to 80 percent of iron and zinc needs through normal consumption of sorghum.

Through the project, vitamin A, iron, and zinc levels are either raised or made more available through the use of transgenic technology. In summary, the project has excellent stewardship, compliance and governance processes and oversight to see the biotech products through, from discovery to commercialization. On the national regulatory side, years of biotech regulatory science training and outreach in target African countries has been conducted and the project has solid relationships with biotech authorities. The Kenya National Biosafety Authority has recently granted a five-year approval for continued ABS project efforts.

The presenters took questions from the audience, and questions centred upon what next steps are needed. Panelist Daniel Kamanga mentioned that Kenya, Nigeria, and Burkina Faso have signalled a desire to work with the research partners on next steps for biofortified sorghum. Confined field trials (CFTs) for biofortified sorghum have been done in Nigeria and Kenya with Burkina Faso as a possible next country test site. Dr Amijee mentioned that while the project has reached many of its goals, what is needed now is additional donor support to finish the final stages of field and nutrition testing and eventual commercialization to market.

7.2 Helping farmers grow: Climate change, food security and the technology nexus

CropLife International organized a side event that explored the specific role for agricultural technologies in combatting climate change and achieving food security. Howard Minigh, president and Chief Executive Officer (CEO) of CropLife International, moderated the panel session which discussed the potential for plant biotechnology, especially in developing countries, in helping to mitigate and adapt to climate change conditions.

The event featured four panelists reviewing the potential plant biotechnology has for food security. Nicolas Cenacchi, Research Analyst, International Food Policy Research Institute (IFPRI), reviewed two studies that analysed the impact of various biotechnologies on crops both regionally and globally under climate change conditions. IFPRI's research looked at how the adoption of biotech-improved varieties shows the potential for reducing the effects of climate change on yields and how this may translate into positive food security outcomes due both to effects on production and global food prices.

Sir Gordon Conway, Professor at Imperial College and Director of Agriculture for Impact, reviewed the potential devastating impacts climate change could have on food production. His presentation covered current conditions in Africa and how population growth, soil degradation and climate change are leading to reduced or stagnating yields during a crucial time where increased production is needed. This is exacerbated by the huge impact pests and disease have on crops. He provided case studies showcasing the benefits of biotechnologies to combat these variables. While biotechnology will not solve the entirety of the problem, he stated, it will be a part of it. He concluded by reviewing the current legislative framework in Africa and highlighting how variable it was, but that African leaders are increasingly cognizant that biotechnology is part of the answer to defeating pests and disease in agriculture.

Julie Borlaug, from the Borlaug Institute for International Agriculture, Texas A&M University, focused on the importance of expanding the conversation about plant biotechnology and food systems beyond the agriculture industry and connecting with new industries and audiences in an effort to take a multi-party approach to solving these complex problems. She also reviewed the need to educate the public, not only on the current state of agriculture, but on the benefits of biotechnologies, as there is a great deal of misinformation and misunderstanding.

Catherine Swoboda, Director of Planning of the World Food Prize, reviewed past winners of the World Food Prize and highlighted the important benefits of their technologies, including plant biotechnology, in ensuring global food security. She showcased how often these winners would put these technologies, often biotechnologies, in the hands of those who needed it the most, the farmers.

The speakers concluded that FAO needs to continue to invest in events like the FAO Biotech Symposium, work with farmers on the ground to develop advanced technologies, and openly provide its support for biotechnologies to achieve global food security. Also, the speakers reached a consensus about the need for farmers to have a choice to utilize biotechnologies, in particular to achieve global food security.



7.3 The voice of farmers: Biotechnology in the field

The side event was organized by the Canadian Canola Growers Association and co-organized by the Brazilian Confederation of Agriculture and Livestock.

The purpose of the side event was to provide a “boots on the ground” perspective on the role of agricultural biotechnology and the challenges farmers face in accessing new technology. The panelists included: Pomasi Ismail (Cocoa Abrabopa Association, Ghana), Dale Leftwich (Canadian Canola Growers Association, Canada), Mugo Makanga (Integrated Community Organization for Sustainable Empowerment and Education for Development, Kenya), Edwin Paraluman (rice and corn farmer, Philippines) and Santiago del Solar (Asociación Argentina de Consorcios Regionales de Experimentación Agrícola, Argentina). The event was moderated by Thiago Masson from the Brazilian Confederation of Agriculture and Livestock.

The panel described the contributions of biotechnology to their farm and respective commodity. The panel reported that herbicide tolerant (HT) and *Bacillus thuringiensis* (Bt) crops have been effective tools to manage production loss. HT canola provides Canadian farmers with a tool to control weeds. Bt corn has provided farmers from Argentina, Brazil and the Philippines a defence against the destructive corn borer, and in the case of the Philippines has made the difference between planting a crop or abandoning production altogether. Today, the Philippines is a net corn exporter. Both these biotechnologies have allowed farmers to use less pesticides, to employ more environmentally friendly inputs, and to widely adopt zero or minimal till farming practices.

A case study of Bt cotton in Kenya was presented. Cotton production has declined because of inability to control insects, and correspondingly ginners are idle, negatively impacting local economies. The Government of Kenya currently maintains a ban on GM crops. Access to Bt cotton could reverse the downward trend and keep Kenyan farmers competitive. It could provide a pest management solution, as well as lower costs of insecticides, improve seed quality and increase yields (e.g. better farmer income).

A key theme was the importance of farmer awareness and grass-root extension activities. How do farmers get access to accurate information on new technology? A multifaceted approach is required to reach farmers. For any agriculture biotechnology to truly take hold, it is critical to manage farmers' perception of new biotechnology and ensure they receive factual information. Misinformation and misunderstanding has created a great deal of confusion on the ground and with the public-at-large.

Various sources were discussed, including the role of farm organizations. Farmer associations or cooperatives are well positioned to share information. They can play a central role in organizing training sessions and site visits, engaging local advisors and demonstrating the importance of better farm management practices and the application of new technology. They also provide a collective farmer voice with government, and can streamline access to credit for crop inputs. Public research

and institutions also play a significant role in ensuring biotechnology is regionally suited and delivered in an appropriate manner.

All the panelists agreed that biotechnology is an important component of sustainable farming in the long term, and a tool to meet the production challenges they face. The panelists stressed that farmers are rational decision-makers and make decisions on what is best for their land, farm and family. New biotechnology and better farm management practices will enhance their farms and ensure the younger generation remains farming. The question is not whether to adopt new biotechnologies, but how it can be done to ensure that farmers understand the benefits, how it builds on existing practices and how it can work locally.



7.4 New breeding technologies for smallholders' challenges

The side event was organized by the Ministry of Economic Affairs of the Government of the Netherlands. It was introduced and moderated by Gerda Verburg, Permanent Representative of The Netherlands to the UN Organizations in Rome.

During the side event the focus was on the different new plant breeding technologies that are available that could address the needs and challenges of smallholders. Smallholders worldwide face multiple challenges in striving to make a living in agriculture that exceeds just being able to feed their families. Plant breeding technologies are key to the creation of new useful plant varieties (e.g. biofortified orange sweet potato, golden rice). Added value, availability and access are key. They can help to bolster production, supply and market value, as well as nutritional content and value of crops (protein, amino acid, antioxidants, vitamins and micronutrient content). Plant breeding technologies can also increase resistance to major pests and diseases and increase the efficiency of “post-farm-gate” practices (processing, storage and shelf-life). And last, but not least, new plant varieties can also be developed to use more efficiently water, nutrients and sunlight. Any innovative breeding technology must prove its added value at grassroots level and thus be adapted to local circumstances. If so, the new variety will contribute to more sustainable crop management, improved yields and better farmers' income. Improved production in a sustainable way contributes also to Agenda 2030 (Sustainable Development Goal 2 and others).

René Smulders, Business Unit Manager, Wageningen UR Plant Breeding (the Netherlands), presented an overview of existing and new plant breeding technologies now available for improving and creating new plant varieties. One is the new gene-editing technique like CRISPR-Cas, which is very quick, precise and cheap. But the toolbox of precision breeding methods contains more than just genetic modification. It provides lots of innovative opportunities that could address changing needs of smallholder farmers. Niels Louwaars, Director of the Dutch association for the plant reproduction material sector (the Netherlands), showcased proven business strategies of seed companies in developing countries. He also stressed the need to counter possible constraints in the area of intellectual property rights and biosafety rules using these new breeding techniques before new varieties could become available for smallholders on scale.

Smallholder, Walter Quispe Huilcca, at the Potato Park in Cusco (Peru) recognized the challenges and stressed the urgency in the broader use of new techniques for smallholder farming. As in the centre of origin of the potato, Parque de la papa in Peru, due to climate change, plant diseases now endanger native varieties at altitudes where they never occurred. Walter was assisted by Alejandro Argumedo, Program Director, Asociación ANDES, Cusco (Peru).

7.5 **Practical approaches to regulation and oversight of agricultural biotechnology: Experiences from developed and developing countries**

The Governments of Canada and the United States of America co-hosted a panel discussion entitled “Practical approaches to regulation and oversight of agricultural biotechnology: experiences from developed and developing countries”.

Panelists from Canada, Uganda and the Inter-American Institute for Cooperation on Agriculture (IICA) shared experiences with regulation of genetically modified (GM) crops. An engaged audience of about 50 symposium participants attended.

Veronica McGuire of the Canadian Food Inspection Agency presented Canada’s three pillars of regulation for biotechnology (science-based decisions, transparency and engagement), highlighting that food, feed and environmental safety underpins the regulatory oversight of GM crops. Dr Barbara Mugwanye Zawedde of Uganda Biosciences Information Centre, under Uganda’s National Agriculture Research Organization, discussed Uganda’s interest in GM crops, including those developed by public sector scientists in Uganda, as a tool for smallholder farmers to enhance productivity, and described the current status of Uganda’s current biosafety bill. Dr Pedro Rocha of IICA talked about the varying positions on GM crops among Latin American countries and outlined IICA’s work in assisting countries to develop practical, science-based policies and oversight frameworks, including efforts to foster regional cooperation.

Recurring themes in the presentations and following discussions included:

- the importance of transparency and public engagement. While many countries acknowledge the potential value of agricultural biotechnology, public acceptance remains an issue;
- the need for capacity building and training for both the development and the implementation of regulations and confident decision-making;
- the need for other enabling factors such as effective seed systems and resolution of ownership and intellectual property issues; and,
- the value and practicality of regional cooperation to share resources, infrastructure and experiences, and to build confidence among regulators and decision-makers. Examples of such initiatives include the Regional Approach to Biotechnology and Biosafety Policy in Eastern and Southern Africa of the Common Market for Eastern and Southern Africa (RABESA/COMESA), and the Initiative for Central America on Biotechnology and Biosafety (ICABB).



In conclusion, while regulatory frameworks are recognized as an essential tool for enabling the safe adoption of agricultural biotechnology to achieve national goals including for the benefit of smallholder farmers, countries seeking to develop and implement such frameworks may need to consider issues such as public acceptance, capacity constraints and other policy and regulatory conditions. This event successfully provided a venue for symposium participants to share experiences and views on addressing these challenges.

