



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 2

## High-level ministerial session





## 2.1 Statement by Néstor Roulet

Secretary for Added Value,  
Ministry of Agro-Industry,  
Argentina

I would like to start by thanking FAO for organizing this international symposium on biotechnology, which is an important development for the whole world.

Argentina is a clear example of what can be achieved with a full and accountable application of biotechnology. Our country is one of the pioneers in the extensive use of this technology, and in the 20 years that have passed since the first event (it will be 20 years this March), we have not only secured social and economic benefits for Argentina, but for the whole world. Argentina has doubled food production in these last 20 years. For example, we have increased grain production from 50 million to 100 million tonnes. This was not achieved by increasing the surface area – which increased only by 18 percent – but by a substantive increase in land productivity.

It is also important to highlight that the use of this technology in Argentina is closely linked to the introduction of other improvements, such as direct seeding and precision agriculture, which have enabled us to intensify our production whilst improving the efficient use of water and nutrients, increasing the production and quality of our products, reducing soil erosion and saving on fuel consumption, resulting in a reduction of greenhouse gas emissions.

Today, Argentina is the country that uses the least amount of fuel per tonne of food produced. This is all thanks to a technological package that includes biotechnologies and direct seeding. Even though these benefits at present are mainly in field crops such as soybean, maize and cotton, they are also becoming available in other crops, including wheat, potatoes, and those with improved nutritional values, such as high oleic acid soybeans. It is likely that in the future, these technologies will be present in other crops, such as safflower and sugar cane.

We are also working on the development of technologies to enable better adaptation to climate change, helping to guarantee food security. This is the case of drought-resistant soybeans and wheat, which we expect will shortly be available to producers.

Argentina also has a research institute, the National Institute of Agricultural Technology (INTA), which is a public institution working, *inter alia*, on the development of genetically modified crops, on vaccines based on viruses and on genome projects, aimed in particular at small producers and regional economies.

In parallel we are developing an active policy on the use of bio-inputs. These include biofertilizers and biopesticides, aiming at replacing chemical inputs and at promoting a more sustainable approach, given that replacing chemical fertilizers and pesticides leads to a major reduction in gas emissions caused by the machinery used for their application.

To conclude, I would like to add two comments. One, on the importance of the legal and regulatory framework, and the other on how we see the future. In relation to the regulatory framework, it is worth highlighting that many of the benefits and improvements that I have mentioned have been possible because the necessary regulatory frameworks were in place. We believe that biotechnology, along with other technological tools, offers us huge benefits; however, for these to become a reality, both regulations and biosafety are essential.

In this sense, I would like to share with you something that makes us all proud. In 2014, FAO recognized our National Advisory Commission on Agricultural Biotechnology (CONABIA), which is made up of more than 20 public and private sector scientists, as a reference centre for the biosafety of genetically modified organisms. FAO reference centres are institutions designed to give technical and scientific advice on specific questions related to global FAO programmes on agriculture and food. Argentina is an example of how proper regulation contributes, to a large extent, to the development of specific technologies or disciplines. Through this decision, we are now in the position to offer the expertise of our regulatory organizations, which include CONABIA, the Regulatory Commission and other associated mechanisms, to anybody who wishes to cooperate in implementing their regulatory systems. This has already been done during a seminar in Santa Lucia and we are hoping to hold seminars in Africa and Southeast Asia later this year or next year.

In terms of the future, we are fully aware of the challenges being faced by the world in addressing the demands of an ever-increasing population, urbanization, greater scarcity of farming lands and water resources for irrigation, together with an also increasing strain on energy resources. All of this leads us to rethink the issue of sustainable agricultural productivity, without affecting diversity but, at the same time, guaranteeing the necessary increase for food production. We have no doubt that an increase in production is required, but not at any cost. This is why we are putting biotechnology within a broader framework, to encompass the bioeconomy, where the goal is to use all biological resources in a more efficient and effective manner, which includes processes, biomass, food production, industrial inputs and the energy that will be required for the next decade.

We would like to confirm our firm commitment to the 17 United Nations Sustainable Development Goals, which were adopted last September, and particularly with those related to the sustainable use of natural resources, ending poverty and eradicating hunger. Today in Argentina, we produce food for 400 million people, and we are only 40 million people. Our goal is to be producing food for 500 million people by 2020, increasing to 700 million people by 2024. We believe that in order to end poverty, adding value at source is essential. This is why we want to end certain levels of primary marketing, whereby we offer the world the products and the world accepts the end products. The challenge is to produce more, with fewer resources in a sustainable manner, and we see biotechnology as a central component in the necessary technological leap, helping not only crop production but also the whole economy, where innovation and technological exchange and cooperation between countries plays a very important role.

Argentina is ready and willing to be part of this process. Many thanks.



## 2.2 Statement by Frédéric Seppey

Chief Agriculture Negotiator,  
Agriculture and Agri-Food Canada,  
Canada

**Mr** Director-General, Excellencies, Ladies and Gentlemen, on behalf of Canada's Minister of Agriculture and Agri-Food, the Honourable Lawrence MacAulay, it is a great pleasure for me to share with you Canada's perspective on agriculture biotechnologies.

I am delighted to share the floor this afternoon with my fellow panelists to share the Canadian perspective on biotechnology and its importance in agriculture. I am also very grateful of the FAO for organizing this week's symposium on such an important topic.

From a food security perspective, we collectively face a number of complex challenges. We are all aware of the forecasts:

- The world must produce 60 percent more food by 2050 to meet demand created by an increased population.
- And this with nearly the same amount of arable land in 2050 as we have today.
- Climate change is expected to have a growing negative impact on agriculture, creating even greater food insecurity than today.

These are some of the key challenges we are facing as a global community.

The world has committed to Agenda 2030 and the Sustainable Development Goals of eliminating hunger, improving nutrition and eliminating extreme poverty around the world.

In order to meet this ambitious target, we need all the tools that we have in our toolbox.

And among these tools are agriculture biotechnologies.

Innovation has a key role to play in the fight against hunger.

We need more productive crop varieties that could increase nutrition and lead to more sustainable practices.

### **Canada's approach**

Let me take a few minutes this afternoon to give you an overview of Canada's regulatory and policy approach to innovation.

In Canada, innovation is a key pillar of our current federal-provincial agriculture policy framework.

Programs and policies are in place to encourage partnership among public and private sectors with respect to research in the agricultural field. Through the years, Canadian producers called for products allowing them to be more competitive, adopt more sustainable and environmentally-friendly practices and be better equipped to meet consumer demand for safe, high-quality and nutritious food.

Providing Canadian producers with choice with respect to the type of products they want to use in their agricultural practices is a central component of our policy toward innovation. The Government of Canada does not advocate for or against any technology – its role consists of providing producers with a selection of options that all meet the highest standards of safety from a food, feed and environmental perspective.

The Canadian government has a robust regulatory system to regulate innovative products. Canada has over 20 years of experience in regulating products of biotechnology through its integrated framework. Canada's approach relies on rigorous science-based safety assessments that protect human and animal health and the environment, and is in line with our international trade obligations.

In 1993, when we considered how to best regulate products of modern biotechnology, we made the choice to regulate the final product rather than the process by which the product was developed. It is the final product characteristics that trigger the pre-market assessments, not the means by which it was developed.

Plants with novel traits and the novel foods and novel feeds derived from them, are subject to safety assessments for environmental, human and livestock health respectively. The three assessments are performed at the same time, with strong collaboration between the agencies responsible for each of the different aspects of the assessments – food, feed and environment.

Such a flexible approach based on products allows Canada to adjust to the emergence of new technologies, such as gene editing and other precision breeding techniques, without having to modify its regulatory framework.

This flexible approach has served us well as demonstrated by the high level of confidence in the regulatory system and the high rate of adoption for plant biotechnology by Canadian farmers.

Another key principle underpinning our approach is transparency. Canada recognizes the importance of transparency in decision-making, including in the development and application of its regulations and is committed to this principle.

Our regulations are posted online and are available to all. In addition, a summary of each of our food safety assessments is shared on the FAO genetically modified food platform. Sound practices with respect to transparency help create a regulatory environment that offers predictability to importers, exporters, seed developers and the feed and food value chains, which in turn gives agricultural producers access to new products resulting from innovation, including biotechnology products.

Allow me to share with you an example that we consider to be a Canadian success story: the development of canola.



Canola was developed jointly by researchers from the Canadian Department of Agriculture and the University of Manitoba in the 1970s. Through this partnership, researchers were able to develop a new crop that, today, generates over \$7 billion in farm receipts – or 13 percent of total farm receipts – putting it just behind the cattle industry.

Canola is at the forefront of Canadian crop innovation, and was one of the first genetically modified plants to be marketed when, in 1995, a herbicide tolerant variety was offered to producers.

As a result, the crop area increased from 143 000 hectares of rapeseed in 1956 to over 8 million hectares of canola planted in 2015. And today, Canada has over 43 000 canola producers who are proud to make this crop a driver of Canadian agricultural prosperity.

This example illustrates what can be achieved through a science-based regulatory environment, coupled with public, private and producer partnerships supporting innovation.

More examples of practical approaches to science-based regulation and oversight of agricultural biotechnology from both developed and developing countries will be presented at a side event to be held today at 17:45 in the Iran Room, just after this high level segment.

### **International cooperation:**

Now, what can we do TOGETHER?

We are at a crossroad in terms of agriculture development. We are collectively facing enormous challenges that will need to be addressed. Biotechnology is an important tool available to farmers and countries to assist in responding to these challenges.

As Dr Fresco noted yesterday, one of the components to help developing countries' farmers benefit from biotechnology is to find solutions to regulatory challenges. In this regard, it is paramount that we encourage innovation in agriculture and provide the possibility for farmers to have access to the best possible products that meet their needs. In Canada's view, this could be best achieved through:

- Development and adoption of science-based regulatory frameworks ensuring the food, feed and environmental safety of these products;
- Increased regulatory transparency;
- International cooperation to build understanding and confidence in one another's regulatory systems.
- Better regulatory alignment, especially at the regional level. Resources are limited, and collaboration can help countries pool resources and target priority areas.

Canada believes that FAO has a pivotal role to play in assisting countries to working toward these objectives.

This symposium convinces us that the FAO should undertake more work on biotechnology. The symposium should not be an end in itself; it must be part of a continuing FAO leadership in facilitating the global dialogue on issues associated with agriculture biotechnology.



In our view and in light of the significant challenges that lie ahead of us, it is not only FAO's role, but its duty to disseminate scientific and evidence-based information on biotechnology.

The FAO can also be instrumental in assisting countries in developing regional regulatory and policy approaches to biotechnology. Through regional conferences, the FAO could lead a dialogue with the different regions on this issue and explore how and what might be done in follow-up to this symposium.

Let me conclude by saying that the principles I have been talking about apply to any innovative practices, not only to agriculture biotechnology. As we were reminded by the Director-General in his keynote address yesterday, the challenges of food security are so great that ALL possible tools should be considered.

Mr Director-General, Excellencies, Ladies and Gentlemen, I thank you for your attention.



## 2.3 Statement by Katalin Tóth

Deputy State Secretary,  
Ministry of Agriculture,  
Hungary

**D**istinguished Chairperson, Director-General of FAO, Ministers and Deputy Ministers, Delegates, Ladies and Gentlemen!

It is a great pleasure and honour for me to participate in this highly important discussion on agricultural biotechnology. First of all, I would like to thank FAO for organizing this symposium, and providing us a neutral forum to discuss this issue in its complexity.

Indeed, agricultural biotechnology is a broad term, which refers to a wide range of techniques and methods and provides plenty of opportunities. The use of biotechnology applications and products can be highly beneficial for the society including farmers. In combination with the traditional knowledge, these techniques and applications, although have significant impacts on plant and animal genetic resources and biodiversity in general, but in return they contribute to meeting the needs of the population and to sustaining life under rapidly-changing conditions.

Please allow me to highlight some of the recent advancements we achieved in Hungary in the biotechnology sector. Over the past 15 years, more than 70 biotechnology companies were founded in Hungary, mainly in the field of so-called red (medical) biotechnology. Most of them were registered in the last five years. Besides these, there are three major agricultural biotechnology research institutes in Hungary (the Centre for Agricultural Research, the Agricultural Biotechnology Centre and the Biological Research Centre) whose aim is to facilitate the competitiveness of the Hungarian agriculture with the latest achievements of their biotechnological experiments.

Nowadays, special attention has been paid to biotechnology, as this is a rapidly emerging field. It may provide solutions for many of the world's major challenges, such as climate change or global food security. Agricultural biotechnology could greatly contribute to the fight against hunger in developing countries, for example by decreasing food loss.

So it is a great opportunity on one hand, but a huge responsibility on the other. It is important to bear in mind that the long-term effects of these novel technologies are still uncertain, so in the future we may come across new unknown types of risks in human and animal health or in the environment.

While Hungary is supportive of biotechnology research and the use of its applications in general, it is a strong opponent of a particular segment of biotechnology, the agricultural gene technology. Our position is based on scientific results and on the precautionary approach addressing the existing gaps and uncertainties in the risk assessment of GMOs. Our scientific studies have proved that several current GM crop varieties have negative effects on the environment and the risks of the cultivation

of these plants have not been adequately assessed. We think that the hypothetical advantages of some “improved” GMO seeds are overshadowed by risks to human health and the environment, which are not yet known to their full extent. Unfavourable social consequences may also arise due to a greater seed supply dependency of farmers. We propose, therefore, to concentrate on the use of numerous other achievements of biotechnology, which have proven to be safe and having undoubtedly benefits and which are not contentious.

We are convinced that agricultural biotechnologies must be based on the precautionary approach in accordance with domestic legislation and relevant international obligations. We believe that there should be more research on social, environmental and health issues, and capacity building for better assessment of biotechnology. Countries also need to be able to monitor and evaluate the possible effects and share the data gathered with all stakeholders. Recognizing the limitations and applying a precautionary approach will help us to address the gaps in our scientific knowledge, respect the importance of traditional knowledge, as well as broaden our options and perspectives.

Finally, discussing modern biotechnology (including GMOs) within the wider context of sustainable innovation and sustainable use of biodiversity is absolutely necessary. We believe that this should go hand-in-hand with employing a participatory and bottom-up approach towards modern biotechnology and its applications.

Excellencies, distinguished Delegates!

Sustainable agriculture using cutting-edge technologies in a safe way is a complex and far-reaching topic. It requires the spirit of cooperation and firm stance at the same time. We have to be wise and responsible in our decisions on how to use its advancement in agriculture.

Hungary is strongly devoted to exchange knowledge on responsible use of biotechnology. A good example of our commitment is the participation in the South–South and Triangular Cooperation Program of the United Nations. In the frame of this initiative, Hungarian scientists and experts can share information about best practices with colleagues of Morocco, Algeria, Uzbekistan and Turkey.

In addition, the Hungarian Government together with FAO has been offering a scholarship program for students arriving from developing countries. Due to this programme, since 2008 over 200 university students have deepened their knowledge in agricultural studies, including biotechnology.

Thank you for your kind attention.



## 2.4 Statement by Papa Abdoulaye Seck

Minister of Agriculture and Rural Equipment,  
Senegal

Senegal is in the process of building a competitive, diversified and sustainable agriculture. It is therefore seeking to incorporate the use of technological innovations to produce more and better quality products. While biotechnology is thus an opportunity to be seized, we have six strong beliefs that must be upheld:

First, biotechnology must be underpinned by robust African agricultural research. Africans must be the users and producers of knowledge and technology, rather than simply being consumers who wait for scientific suggestions that do not necessarily meet their needs. This requires large-scale investment in agricultural research, since evidence shows that competences should be created, not dictated.

Second, biotechnology must not result in dependency that impedes the availability and accessibility of production factors, particularly for small farmers. We wish to promote sustainability of production systems, security of rural revenue, reclaiming of domestic markets and a better position on the world stage.

Third, biotechnology is not incompatible with agro-ecology. Tolerant plant varieties created through biotechnology can be of better sanitary and phytosanitary quality, resulting in a reduction in the number and volume of chemical treatments required. Biotechnology also enables marginal lands to be cultivated and to face climate change, a constant concern for humanity.

Fourth, biotechnology must not just be an issue for specialists, but for the whole of society. This is why awareness raising among all rural workers and consumers is urgently needed to manage fear of change and promote intelligent application. To this end, in Senegal, we have established a legal and regulatory framework to regulate the production and use of biotechnologies.

Fifth, biotechnology is a tool for bridging the global agricultural divide and promoting equity. By “agricultural divide”, I mean the difference in agricultural productivity between developed and developing countries, owing to the number of technical operations in use that can lead to positive change. By way of example, in Senegal, thanks to biotechnology:

- The yield of rainfed rice could be increased four-fold; in banana, five-fold; and in tomato, two-fold.
- With artificial insemination, 30 to 50 litres of milk can be obtained from improved cattle breeds, as opposed to 1–3 litres from local breeds.
- There is better management of animal health problems owing to more reliable disease identification (African horse sickness, avian influenza, Newcastle disease) and vaccine production.

Sixth, biotechnology can contribute to maintaining and strengthening biodiversity through better molecular characterization of crops.

In conclusion, to be translated into economic and social progress, all scientific progress should be used carefully and realistically. To this end, farmers' aspirations and the constraints they face should be central to scientific considerations. This is a prerequisite for achieving useful and usable results that will change the face of world agriculture.



## 2.5 Statement by Begum Matia Chowdhury

Minister for Agriculture,  
Bangladesh

Honourable Chairperson, Distinguished delegates from different (member) countries, Diplomats, Representatives of Development Partners, Distinguished Guests, Ladies and Gentlemen,

As-salamu Alaikum and Good Afternoon to you all.

I have the honour to be here in this symposium on the “The Role of Agricultural Biotechnologies in Sustainable Food Systems and Nutrition”. Thank you very much for the invitation to this important event in the beautiful city of Rome.

Distinguished Participants,

Agriculture is the primary base of livelihood and the heart of Bangladesh’s economy and has made significant progress since our independence in 1971.

Rice is the staple food of Bangladesh and the production of rice has increased from 23.53 million metric tonnes (MT) in 2006 to 34.60 million MT in 2014. The increased production has been possible with intervention of modern crop varieties and technologies. The productivity of wheat has also substantively increased by the development of heat tolerant and high yielding wheat varieties. Similarly, maize production has significantly increased with highest productivity in South Asia. The country is now self-sufficient in cereal production to ensure the food security of the country.

The success was achieved by developing climate resilient and high yielding varieties of rice and wheat. Bangladesh has also made significant progress in potato production with a production of 9.50 million MT in 2014 against 4.16 million MT in 2006.

The country is now working hard for nutritional security. Recently the zinc rich and wheat varieties were developed. Vegetable production has increased manifold in recent years, rising from 2.03 million MT in 2006 to 13.8 million MT in 2014. The production of fruits, pulses, oilseeds and spices are not adequate to meet the requirements, which needs to be increased manifold.

By now, the country is transformed from subsistence to semi-commercial agriculture and working for commercial agriculture through technological intervention.

Dear Participants,

In spite of achieving this success, agricultural production in the country is facing number of challenges due to population pressure and conversion of agricultural land for urbanization.



Salinity, drought, flood, hot and cool climate, soil degradation, groundwater depletion, infestation of pests and diseases are the common problems for crop production and the problems are worsening due to climate change.

The country faces natural disasters every year affecting land productivity and food production. The population of the country is estimated at about 160 million. To meet the huge demand for food and nutrition in future; conventional agriculture is not sufficient to meet the upcoming challenges of increased demand.

Ladies and Gentlemen,

Application of modern biotechnology provides an opportunity to improve productivity as well as production through development of biotic and abiotic stress tolerant varieties of major crops.

Biotechnology provides an opportunity to transfer genes from a wide range of living sources, not just within the crop species, but from other species.

The combination of conventional crop improvement approaches and modern biotechnological techniques can contribute to human well-being by increased production and nutrition. Genetically engineered (GE)/GM crops have positive impact on farm incomes worldwide through enhanced productivity and efficiency. About 28 countries are cultivating GM crops (e.g. Bt brinjal/Bt cotton).



Dear Participants,

Honourable Prime Minister of Bangladesh Sheikh Hasina is committed to ensuring food and nutrition security for the people, especially the most vulnerable group of mothers and young children through a comprehensive approach for food availability, access and utilization for their nutrition.

It has been mentioned earlier that Bangladesh attained self-sufficiency in food production when the country's gross production in cereals (rice, wheat and maize) reached at 38.17 million MT. In addition, the dietary diversity is increasing by diversification and intensifications of crops through improving cropping patterns.

The availability of fruits, vegetables, pulses and oilseeds is increasing in their daily diet indicating nutritional security of the common mass. We are trying to introduce new food in our dietary system like seaweeds, which is rich in nutrition. The country has enormous potentials to produce seaweeds in the coastal belt of the Bay of Bengal.

Honourable Chairperson,

Realizing the importance and benefit of biotechnological intervention in our perspective, Bangladesh has started biotechnological research at some leading national research institutes and public universities on a number of important crops.

Four varieties of Bt brinjal have been developed against fruit and shoot borer by the Bangladesh Agricultural Research Institute (BARI), one of the leading research organizations of the country. These varieties are now being cultivated in farmers' fields on a limited scale.

It is to be mentioned here that the brinjal is an important vegetable of Bangladesh and that the fruit and shoot borer is the most harmful pest hampering its production. The cry1Ac gene was introgressed in our local brinjal varieties to develop these Bt brinjal. The cultivation of Bt brinjal significantly reduced the use of harmful pesticides.

In addition, confined field trial (CFT) of late blight resistant (LBR) potato is being conducted to protect potato from late blight diseases – a very devastating disease of potato. The institute is working on polymerase chain reaction (PCR)-based detection and characterization of tomato leaf curl virus and on the development of a tomato transformation protocol.

The protocols for seedling production using tissue culture of fruits (banana, jackfruit, pineapple, papaya, grape etc.); vegetables (potato, brinjal, sweet gourd, tease gourd, watermelon etc.); and flowers (orchids, rose chrysanthemum, gladiolus etc.) have been developed for quick multiplication. Somatic embryogenesis, *in vitro* regeneration of some horticulture crops are also going on in different laboratories.

Distinguished Participants,

I have mentioned earlier that rice is our staple food and we have given due importance for the



improvement of rice through biotechnological tools. Contained and Confined Trial of golden rice were conducted by the Bangladesh Rice Research Institute (BRRI) in collaboration with the International Rice Research Institute (IRRI).

Submergence tolerant rice varieties have been developed through marker-assisted breeding, namely BRRI dhan 51 and BRRI dhan 52. Also, quantitative trait loci (QTLs) for zinc have been identified from local rice variety (KaloBokri).

Besides some important ongoing research on rice are gene pyramiding for resistance to bacterial blight, salinity, submergence, and heat tolerant rice through marker-assisted selection and identification of QTLs for salinity tolerance and cold tolerance both at the seedling and reproductive stages.

Genetic fingerprinting of rice and sugarcane has also done for characterization of the crops. The milestone was set by genome sequencing of jute and its fungal diseases by the Bangladesh Jute Research Institute (BJRI) in collaboration with the University of Hawaii in the USA. Different public universities are also working on genetic transformation, micropropagation and stress breeding on a number of important crops.

Dear Participants,

With every new emerging technology, there might be some potential risks. There is a widespread concern regarding the safety of biotech crops. Though GM crops have potential risks, it still provides great benefit for the improvement of crops. Its potential risk can be avoided through rigorous testing and safety assessment before any such crops are approved for commercial cultivation. Development and use of GM products requires appropriate policy, controls and cross-border movements to protect human health, biodiversity and the environment.

Considering the facts, the application of modern biotechnology requires adequate legislation and capacity building in relation to institution and human capacity. Bangladesh as a signatory of the Cartagena Protocol on Biosafety is committed to developing and implementing the biosafety regulatory system.

Bangladesh adopted biosafety guidelines in 2005 and a framework in 2007 to conduct biotechnology research and testing of GM products.

In order to enforce the biotechnological research, the government approved “Biosafety Rules of Bangladesh” in 2012. Recently, the Ministry of Environment and Forest has adopted “Guidelines for the Safety Assessment of Foods Derived from Genetically Engineered Plants”.

The country is conducting biotechnological research following all international rules and regulations. Some of the national agricultural research systems (NARS) institutes and public universities have good laboratory facilities and others are in the developing stage. But we need more skilled technical personnel in our national research system, especially on biotechnology.



Ladies and Gentlemen,

In conclusion, I would like to mention that Bangladesh is a country of boundless potential which was born in 1971 under the great leadership of the Father of the Nation Bangabandhu Sheikh Mujibur Rahman through historic liberation movement.

The Honourable Prime Minister Sheikh Hasina has successfully established the vibrant economy for the country. We are trying to make the country free from hunger and poverty under the dynamic leadership of the Honourable Prime Minister.

Democracy of the country is the key point of these growth and development along with gender balance, good governance and favourable agricultural policies. We are pursuing an inclusive growth strategy to become a middle income country by 2021 and a developed one by 2041 under the dynamic leadership of Sheikh Hasina, Honourable Prime Minister of Bangladesh. We established a climate change trust fund from our own resources.

The 6th Five Year Plan has been successfully executed and it makes the country self-reliant in food production. We have formulated the 7th Five Year Plan to make the food security sustainable in our country. Due importance is given on biotechnological research and development in our present Five Year Plan along with a number of priority areas. Some development partners are working with us for the advancement of the country aiming at food and nutrition security by using modern biotechnology and other tools.

We are producing food to feed the people and therefore, we are not supporting the conversion of food to bio-fuel. We would be happy if we get more support in the field of agriculture from the development partners in our development pursuits.

Our joint efforts will certainly make this beautiful world free from poverty and hunger.

Finally, I would like to conclude my speech by saying that we will conserve the nature but we will not be conservative denying the facts and achievements of biotechnology as well as Science. Our choice is very simple– whether we will have pesticide or pesticide-free GM food.

Thank you very much to all of you once again.

Joy Bangla, Joy Bangabondhu.

Long Live Bangladesh.

## 2.6 Statement by Henri Eyebe Ayissi

Minister for Agriculture and Rural Development,  
Cameroon

**D**istinguished Ministers, Director-General, Your Excellencies, Ambassadors and Permanent Representatives, Distinguished delegates, Ladies and gentlemen,

As Minister for Agriculture and Rural Development of Cameroon, I have the honour and the pleasure to take the floor here today to share with you Cameroon's experience with regard to agricultural biotechnologies.

Before I start, I would like to express our deep appreciation to the Italian authorities for the warm hospitality they have shown the Cameroonian delegation, and for all the facilities they have put at our disposal since our arrival here in Rome.

I would also like to take this opportunity to express our sincere congratulations to FAO Director-General, Mr José Graziano da Silva, for taking the initiative to hold this international symposium on the role of biotechnologies in sustainable food systems and nutrition, and for inviting us to take part in this important event.

Ladies and Gentlemen,

The agricultural way of life in Cameroon is both an established fact, and a deliberate political choice on the part of the President of the Republic, his Excellency Paul Biya, who has made agriculture the cornerstone and driving force of Cameroon's economy and development. The agriculture sector involves more than 70 percent of the population, and accounts for almost 52 percent of gross national income.

Another objective reality has become apparent over time: low levels of agricultural productivity. With a view to ensuring availability of food for an ever-increasing population, and in order to substantially reduce imports of food products, Cameroon has been committed, since 2011, to what is known as "second generation agriculture", which is in line with all major FAO guidelines on food and nutrition. In this regard, the Government of Cameroon has shown committed political will, and has engaged with all stakeholders, including the private sector and civil society organizations.

In this context, it should be pointed out that agricultural research in Cameroon is already well under way in respect of conventional and modern biotechnologies, with a view to markedly improving both the quality and quantity of foods available to the population.

Several research institutions are involved, including:



- The Institute for Agricultural Research for Development (IRAD) in Yaoundé, the activities of which involve a wide range of agricultural products: grains, roots and tubers, pulses and fruit trees, as well as research into cattle and aquaculture. The Johnson Biotechnology Laboratory within IRAD, which was established in 1986, deals with *in vitro* root and tuber culture (cassava, sweet potato, banana and plantain, taro and yam);
- The Centre for Research and Biotechnology (CRB) of the University of Yaoundé, which comprises two sections: a section for plant biotechnologies, and a section for animal biotechnologies. This centre also conducts research into biofertilizers (mycorrhiza);
- The Faculty of Agronomy and Agricultural Sciences (FASA) of the University of Dschang;
- The African Centre for Banana and Plantain Research (CARBAP), which is a public, subregional research institution established in 1989, conducting plant selection on banana and plantain plants, focusing mainly on the production of hybrids resistant to specific diseases and parasites;
- The International Institute of Tropical Agriculture (IITA), which is conducting research into the development of new varieties of cassava, banana and plantain plants and has a biotechnology and molecular biology laboratory which is producing plants *in vitro* and supporting diagnostic study of parasites and diseases;
- The biotechnology laboratory of the University of Buea;
- The Cotton Development Society (SODECOTON) laboratory in Garoua, which is working jointly with IRAD to introduce varieties of cotton into Cameroon, especially Bt cotton, work which is still at the experimental stage; and
- The national veterinary laboratory (LANAVET) in Bokle (Garoua), which specializes in the production and trade of vaccines for cattle, sheep, goats and poultry.

The use of classic biotechnology has enabled various high-yielding, disease resistant and drought tolerant plant varieties to be introduced in Cameroon. For example, varieties of “new rice for Africa” (NERICA) rice, maize, sorghum, root vegetables and tubers (cassava, yam, sweet potato, potato) palm trees, cocoa, coffee, cotton and banana plants.

Similarly for biofertilizers, the use of mycorrhizal fungi, *Azolla* and *Rhizobium* for improving phosphorus and nitrogen needs in plants such as cocoa, coffee and tea plants, pulses and grains, is at the experimental stage.

In order to ensure that modern biotechnology is used properly, without causing any threat to local populations and the environment, particular attention should be paid to: (i) the risks associated with using transgenic crops, and whether they could be harmful to people’s health; (ii) allergens and toxins; (iii) the impact on non-target species; (iv) insecticide resistance; (v) loss of biodiversity; and (vi) complex technologies that are hard for farmers to access and not easy to adopt.

Other potential uses are being investigated, such as the introduction of varieties of certain tree species of economic importance that are high-yielding, have high nutritional content, are disease- and pest-resistant, climate-smart and have a short growth cycle.

Steps remain to be taken, however, to strengthen the legislative framework with regard to biotechnology, through the law regulating the use of modern biotechnology, which was adopted in 2003, and other legislative instruments, which include: the framework law on the environment, the

biosafety act, the act on classifying hazards, the seed act, the phytosanitary act, the decree on the application of the biosafety act, the decree on the establishment of the national biosafety committee, the decree on seed quality control, the decree on the establishment of a seed quality control council, as well as the application of international conventions to which Cameroon is party, including the Rio Convention on Biological Diversity and the Cartagena Protocol on Biosafety.

Fully aware of the potential of agricultural biotechnologies in sustainable food systems and nutrition, the Government of Cameroon organized a series of meetings at the national level:

- In 2012, the Embassy of the United States of America organized a meeting with a specialist from the New Partnership for Africa's Development (NEPAD) as the keynote speaker. The aim of the meeting was to highlight the advantages of using biotechnologies in Cameroon.
- On 4 September 2013, also at the initiative of the Embassy of the United States of America to Cameroon, a conference on biotechnology was held, entitled "The contribution of biotechnology to the Cameroonian agriculture sector".
- In September 2015, a national forum was organized on formalizing the use of certain technologies, including the use of genetically modified organisms, in Cameroon.

In conclusion, distinguished Ladies and Gentlemen, Cameroon has chosen to exercise care with regard to the use of biotechnologies; seeking to improve the productivity of land currently in use, while at the same time seeking to guarantee biosafety for its people.

Thank you for your attention.



## 2.7 Statement by Gerda Verburg

Permanent Representative of the Netherlands to the UN Organizations in Rome,  
on behalf of the Kingdom of the Netherlands

The Netherlands commends the Director-General and FAO for organizing this BIOTECH Symposium, two years after the Symposium on Agro-Ecology.

It's an excellent moment to make clear that we need all kind of sustainable and innovative agricultural systems and techniques to create food security and nutrition for all people (leaving no one behind) and at the same time deal with climate adaptation and mitigation.

We need agro-ecology *and* biotech as a toolbox; they are interlinked, we need them to walk hand-in-hand, to work together, to inspire each other, to learn from each other.

Traditional knowledge combined with innovative technologies and opportunities can contribute to productive, sustainable agriculture and food systems.

At the same time we have to recognize that it will be quite a challenge to make them work together. Sometimes one has the feeling that it is either-or-. And each way of production has strong advocates pro and con and they don't touch only on agriculture and food but also on food safety, health, environment, social impact, economy and even justice.

Looking at the challenges for today and tomorrow, it's time for a paradigm shift.

A paradigm shift to fulfil Agenda 2030: Zero Hunger, improved nutrition, zero stunting, 100 percent sustainable agriculture, 100 percent increase of smallholder incomes, about healthy oceans, sustainable forestry, a better position for women and women farmers, etc. etc.

A paradigm shift, because at the same time we know that farmers and people in the rural area are most impacted by the effects of climate change. Droughts, heavy rains, floods etc.

A paradigm shift, because we have acknowledged that we need to work together as partners to get sustainable and durable results. Governments cannot do it alone, neither can business nor farmers, science and research or civil society. We need partnerships in which every partner has a specific role.

Only by working together, by listening, learning to understand each other's language, starting to discuss and agree upon challenges, causes and possible solutions, different stakeholders will be able to build trust. And in the Committee on (world) Food Security (CFS) we have learned that *trust* is crucial to work together and be successful at all levels, including at grassroots, taking into account local realities.

Building trust won't be easy because some gaps are big. For example about Breeders rights and intellectual properties, about ethics, about possible environmental or health impact, even about the size of a farm; do we only need family farmers and smallholders to feed the world or do we also need bigger farms?

So where do we go from here: FAO has taken the initiative to put Agro- ecology and Biotech on the agenda to create future for both.

This Symposium should be the starting point to bring the different stakeholders together and offer them room and support to start to work together in order to stimulate co-existence, collaboration, share lessons learned, to tackle long-lasting problems like on breeders rights and intellectual property.

How to make agriculture and food systems more sustainable by developing the right links to markets and the food value chain.

How to connect farmers and research to make research more farmers-oriented, how to build supportive and inclusive institutions, for example to support participatory precision breeding programs and promote open access to precision breeding methods.

How to get legislative systems and regulatory processes ready and well equipped to support transparent policies and developments.

The future of agriculture and food systems must be built on sustainability, inclusiveness, transparency, (multistakeholder) partnerships and trust.

Only then we can implement Agenda 2030, end hunger, make agriculture, forestry and fisheries sustainable and durable, create equal opportunities for men and women, attract young farmers to take over, support a better life in the rural area and hand over our planet in a better condition to our children and grandchildren.

Thank you for your attention.



## 2.8 Statement by Michael Scuse

Under Secretary for Farm and Foreign Agricultural Services,  
United States Department of Agriculture,  
the United States of America

Thank you. My name is Michael Scuse and I am the Under Secretary for Farm and Foreign Agricultural Services at the United States Department of Agriculture. I would like to thank the FAO and Director-General José Graziano da Silva and his staff for organizing this important Symposium. Thanks also to my distinguished colleagues in this session, and to all the participants providing insights in these important discussions.

Like the FAO, the United States believes we are witnessing an unprecedented confluence of pressures on global food and agriculture. These pressures have the potential to cause significant environmental degradation, and to exacerbate hunger, poverty and malnutrition. Our agri-food systems, our environment, and even our societies are being threatened, especially in developing countries. These challenges are very real and so should be our responses.

This symposium has renewed dialogue and highlighted a simple message that goes at least as far back as Agenda 21 and the 1992 Earth Summit in Rio – ***that the safe and appropriate use of biotechnology is one of the most important tools to foster sustainable agricultural development.***

There is no single technology or approach for making the transition to sustainability. But science, knowledge and evidence should be the basis for our decision-making. All of the technologies discussed at this Symposium have a critical role to play. Increasing populations and stagnant yield gains for major staple crops are driving the need for increased productivity on existing cultivated lands. The use of agricultural biotechnology is helping improve livelihoods for smallholder farmers and helping adapt agriculture to the expected impacts of climate change. The Stress Tolerant Rice for Africa and South Asia (STRASA) project and the New Rice for Africa (NERICA) project are just two of many notable successes that demonstrate this.

The question for all of us now is: What should we do with this message? How should we move forward? Empowered with new evidence, having built new relationships, and being reminded of the urgency of the situation and the pressure upon people, our food and agriculture systems, and the environment, what is it that we do now?

We are all well aware of the issues surrounding public acceptance of agricultural biotechnology, most notably genetically modified (GM) crops. I believe these particular challenges compel us to ask ourselves: What are our duties and responsibilities? Are we willing to accept the notion that these challenges are somehow just immutable facts of life, or do we feel there is a stronger obligation for us to try to make progress and overcome the obstacles to the deployment of safe and beneficial new technologies?



As some of you may know, almost twenty years ago the U.S. papaya industry in Hawai'i was saved when our growers adopted a GM papaya that provided resistance to a devastating viral disease. This happened at a time when no other options were available. It is a great story, but this experience needs to be better understood so that the lessons we learned can be replicated when necessary. For example, next week I will be in Florida, where the citrus industry is being decimated by citrus greening disease. Growers face the possibility of their groves being wiped out completely. Not because there is no viable solution, but because of possible challenges regarding public acceptance of the best/only viable solution – a greening-resistant, GM variety.

So, I have to ask, are we in a position to take any safe and useful technology off the table? Is this the direction we want to be moving? I don't think it is. I don't think we should be eliminating viable and vital tools in the face of climate change, in the face of increasing global demand for food, and in the face of increasing pressures on the environment and biodiversity.

Not when genetic modification can help re-introduce the American chestnut tree – a once dominant, keystone species of our Eastern deciduous forests before it was decimated by blight in the early twentieth century. Not when genetic modification can help produce healthier, more nutritious foods – things like:

- high-oleic soybeans, with increased levels of healthy mono-unsaturated fats; or
- White Russet potatoes, with reduced levels of acrylamide, a potential carcinogen; or
- a yeast that has been engineered to produce omega-3 fatty acids, which is helping reduce pressure on wild fish populations by providing an alternative source of these important nutrients; or
- crops that provide needed vitamins and minerals like vitamin A, zinc and iron, and that can help address severe micronutrient deficiencies that billions of people around the world suffer from.

Not when “Bt” crop varieties, including eggplants and cowpea, can greatly reduce pesticide use and exposure in some of the most important vegetables and pulses in the developing world. Not when GM, virus-resistant cassava and banana can help improve livelihoods. Not when GM reduced-methane rice can mitigate greenhouse gas emissions from rice production, and when there are GM salt-tolerant crops that are able to grow in areas where soil salinity is increasing due to climate change. And not when GM crops are helping reduce the environmental footprint of agriculture.

According to a 2010 report by the U.S. National Research Council, GM crop adoption in the United States has significantly reduced insecticide use, driven down carbon dioxide emissions, reduced agriculture's water use, and has improved soil and water quality.

And the list goes on.

If we believe that acceptance challenges are just limited to one type of agricultural biotechnology – genetic modification – it is worth considering how these acceptance challenges will impact the agricultural biotechnologies to come. In many ways, GM crops are emblematic of the power and the possibility emerging from the decades of scientific research. Will acceptance challenges associated with GM crops in fact be carried over for any and all new and emerging agricultural biotechnologies?



We anticipate that rapid advances in knowledge and development of new technologies will continue, but has the future of these technologies already been pre-empted?

We believe the FAO is an important partner in finding answers to these questions, both because of its expertise, and because it is a neutral forum for sharing reliable, science-based information. The role of the FAO is especially important for addressing the most controversial topics, like genetically modified crops, where decision-makers in developing countries could benefit from unbiased, reputable information. To put it another way, if the FAO does not engage meaningfully and clearly in these debates, who does? Who better than the FAO to put the range of technologies in a broad context, and align them with the challenges they are poised to address?

Perhaps part of the acceptance challenge is political, and surely part of the resistance to GM crops comes not from questions about their potential contributions to sustainability, but from unease with their place in the market alongside conventional, organic and identity-preserved products. We must recognize that there is more market differentiation in the agricultural sector than ever before. This new complexity, just within the last decade, along with consumer expectations that do not match what the market can practically provide, has contributed to questions and fears about how GM presence may impact different market segments.

To address these issues, we would like to propose, for FAO Members' consideration, that we develop a multi-year program of work that focuses on the strengthening of science-based decision-making processes for GM crops developed by the public-sector to address sustainability challenges faced by smallholder producers in developing countries. Components of such a work program could include:

- (1) strengthening governance systems for the oversight of these products, including best practices for science- and evidence-based decision-making;
- (2) exploring potential opportunities for global and regional coordination; and
- (3) sharing information about mechanisms and strategies that have been deployed by FAO Members domestically for supporting co-existence of GM crops with organic, conventional, and identity-preserved agricultural production.

In closing, on behalf of the United States, I would like to thank the FAO once again for organizing this symposium. I look forward to continued dialogue and consideration of these matters with the FAO and its Members.

## 2.9 Questions & Answers with the moderator

The high-level ministerial session was organized in two parts, where high-level representatives of four FAO member countries made statements from the podium. After each part, there was time for at least one question from the FAO Moderator (Marcela Villarreal, Director of the FAO Partnerships, Advocacy and Capacity Development Division) and answers from the high-level representatives.

### **QUESTION 1. Marcela Villarreal, FAO Moderator**

Earlier you heard from the FAO Director-General. He said he would like to hear from our distinguished panelists what they see as the future for FAO in terms of biotechnology – what is FAO's role?

#### **Frédéric Seppey, Canada**

Yes, I covered the role of FAO to a certain extent in my presentation. I think that the multilateral nature of the FAO, its expertise on food and agriculture elements, makes it a forum where we can have an excellent dialogue in that regard. I must say that we very much appreciate the opportunity in the symposium to have civil society, private sector and colleagues from all the membership gathered and having the opportunity to exchange, not only in sessions, and we find that the symposium right now is extremely rich, but also in side events or in corridor discussion. This is a unique venue for all of us to exchange on issues that are very complex. I think that in the various presentations we see that, although we may have different perspectives and different regulatory legal realities, there are a lot of very interesting ideas and agricultural biotechnology is much more than GMOs. We heard yesterday about very interesting innovative practices that I think can benefit all of us.

The main element that I think the FAO adds is the regional footprint because in an event such as this there is just a logistical limitation in numbers, despite the fact that we can webcast etc. But we do hope that we can have this dialogue continued in various regions of the world to deepen it and to have more of the scientists, regulators and policy-makers exchange and share their experiences and perspectives in that regard.

#### **Katalin Tóth, Hungary**

The main element concerning Hungary's point of view was heard in my statement and as you could witness we have a very specific position on this symposium. However, we are very grateful to be here and to be able to share our views on the issue with you. What I wanted to emphasize is that sharing knowledge and having a full, complex and comprehensive picture on the issue is a question of primary importance for us. That is why we would like to keep the so-called precautionary principle in mind, as I have stated before that we don't have a very clear picture about GMOs and it is the main threat we address usually when speaking about biotechnology. However, as I also stated, we have founded a lot of institutions lately to deal with this issue. So, it is very important. However, to have all the necessary information, to share it with the farmers and to have our voice heard is very important in this case.



As far as FAO's role is concerned, I think sharing knowledge, techniques and solutions in agriculture is a key element, so it should be the focus for the future as well. That is why training the future generations and sharing the basic knowledge and innovations with developing countries is a crucial point as well. That is why, as I mentioned before, we organized several programmes which address students as well as farmers. Last year we were invited to take part in the United Nations South-South Cooperation. We got familiar with the needs of the farmers and people concerned with agriculture and the issue of biotechnology and they're asking us to address this issue, so it is on our agenda. However, we have a very strong and oppositional position concerning the GMOs as we don't know what the future brings and that is why we say that we have to be very cautious and we have to be very careful when involving everything under one umbrella.

### **Papa Abdoulaye Seck, Senegal**

We have more or less addressed this issue in our statement. Last year we organized a major international conference on agro-ecology in Dakar. We would certainly be willing to pursue this initiative with FAO and all partners as a means of moving from the theory to practice. In other words, how is it possible to find interrelationships between agro-ecology and biotechnology to be sure of placing our agriculture in a sustainable and productive dynamic? This could form an axis for cooperation between us.

Another axis for cooperation: If an assessment of existing laboratories in African countries is not carried out and careful thought is not given to see how it may be possible to upgrade these laboratories, we will end up in conferences listening to what the laboratories have instead of what our laboratories produce. In the interest of fairness, it is important that international institutions contribute to enable us to assess existing laboratories so that we can see to what extent it is possible to upgrade them, even if it means creating reference laboratories on very specific subjects within a framework of effective capacity development so that we can play our role and everyone can benefit.

For example, we have the vaccine production laboratory in Senegal which is a reference laboratory. The laboratory in Farcha is also a reference laboratory. Perhaps other laboratories ought to be upgraded as well as boosting research in this field because we are, what I sometimes like to call, users and producers of knowledge. Without this, every day we will hear you say: biotechnologies, dependence, etc. No! We need to say that the world makes progress if its different parts progress and it is not possible to make progress without strong agricultural research. At present, developing countries are not in an ideal position to undertake quality biotechnology research. Today, we are much more likely to be waiting for a science-based offer; something that we no longer want. We want to offer our solutions and this is something that can be done through research. Therefore, I would urge FAO to help the countries to carry out an assessment and upgrade their national laboratories and also to foster the emergence of cost-sharing regional laboratories, effectively enabling them to take responsibility of the comprehensive challenges related to biotechnology.

The other axis that I think is important: people speak of dialogue, but a dialogue needs to be structured. Perhaps we should strive to create observatories in different countries, perhaps federate and have regional and even international observatories on biotechnology, which would be multi-stakeholder observatories that should enable one and all to express their concerns on biotechnology and enable others to reassure them, so that we can have collaborative analyses resulting from collaborative activities on biotechnology.

It is possible to list more axes, but for the moment I will stop there. In summary, strengthening axes on agro-ecology, assessments and upgrading of our laboratories and creating biotechnology observatories based on a multi-stakeholder framework of dialogue.

### **Néstor Roulet, Argentina**

In our case we have already explained how biotechnology along with other technological packages have helped to restructure agricultural production in general terms, not only for farming but also for livestock, dairy and regional economies. These are the reasons why biotechnology is so important to us.

We believe without a shadow of doubt that FAO must be proactive, which for us is something extremely important. FAO must somehow continue to organize these conferences and these meetings, which if they were to be regional would be of great significance. Nevertheless, in Argentina we always say that symbiosis has been achieved, a very good relationship between all stakeholders in the production chain and among the general population.

I always say that as well as Argentina's great soil and great climate, we have been able to add two things in the last 20 years, which is the possibility of agro-input companies offering this type of innovation and technology together with public bodies. Nevertheless, the bonus, which I think is something important and which needs further work in the country, is the technology absorption of the Argentinian farmer. It seems to me that we need to work seriously, as I said in my initial speech, on the issues of control and biosafety, something that Argentina is doing extremely well.

It is clear that FAO's recognition of the National Advisory Commission on Agricultural Biotechnology (CONABIA) is something that fills us with pride. However, I would also like to say that universities, NGOs and public bodies are also involved. There are protocols in place, a clearly defined system based on morphology and physiology, work carried out in conjunction with the environment and comprehensive work on markets and food safety. After much work, all of these practices, all of this science, comes through to this Commission, and may or may not be approved. Indeed, many experiments have not been approved. In short, as it forms part of the State it unquestionably puts me at ease, because it is something that we are not only telling the people of Argentina but also the world. Ladies and gentlemen, these procedures that we are using are totally safe in terms of morphology, physiology, the environment and food, which is why I believe that the world needs this technology.

Another thing that I would like to clarify is that our vision encompasses not only food but also energy, which is a very important issue. For example, in our case, we are using this technology to produce bioenergy. An illustration of this is that last week Argentina increased the percentage of ethanol in its gasoline by 20 percent.

In essence this is all thanks to biotechnology. It enables us to do these things because we have overcome a production barrier. For example, in 1996 we produced an average of 5 tonnes of maize per hectare and today we are close to 9 tonnes per hectare. This is why we think it is extremely important. This is the message we have for all countries that are open, that as Argentinians, as inhabitants of the planet who wish to eradicate hunger and poverty, who wish to tackle global warming, I believe that these are very important tools. This is why I think that FAO has to play an active role. I am grateful for this symposium, but undoubtedly I would ask for much more and hopefully people will listen to us.

**QUESTION 2. Marcela Villarreal, FAO Moderator**

At this time, we are in direct link with seven universities around the world as well as with a number of students here locally in Rome. What we have discussed this afternoon has been transmitted throughout the world and the students who are listening to us will be able to react later in the student session after this high-level segment. So, I would like to ask our panelists if they would send one message to the young people who are listening to us throughout the world. What would your message be to the young generation on the topic of biotechnologies?

**Frédéric Seppey, Canada**

I presume that the message can be very different depending on the context. I think it is a very exciting moment to be in agriculture because the challenges that we globally face call for stark, very clear solutions. In Canada right now, we have a new government that has introduced a slight change in orientation. We have, for example, issues like climate change that take more prominence. It is a priority of the new government, to the point that our Ministry of Environment is now the Ministry of Environment and Climate Change and one reaction that we see early on is that the agricultural sector is quite keen to participate in trying to work globally and trying to find solutions to that global challenge. So this is just one illustration where by adopting novel, innovative practices, by working together, there will always be a very important role for agriculture in feeding the world, especially with the challenges that we have. I think it is the role of governments and the political elite to provide this global orientation.

Now, in terms of a Ministry of Agriculture we definitely want to favour a change in terms of our research, to encourage as many students as possible to go in these fields because the possibilities of work, and work of significant importance that could make a huge difference, are enormous. So, this is contrary to what some commentators in Canada recently said – that agriculture is really a sector that is dealing with nineteenth century commodities. I know that in many parts of Canada these kinds of allusions generated a very passionate reaction because agriculture is anything but a sector of the past. There is a lot of innovation to take place in that area.

**Katalin Tóth, Hungary**

If I have to sum up in one sentence I would say: let there be more and more farmers all over the world, and responsible farmers. As far as this question is concerned, to address the young generation is a complex issue in the sector of agriculture. Each country faces the same problems, how can we address the young people, how can we divert them to agriculture? It is very, very difficult. We have a family farm at home with 100 hectares of land and I have a 20 year old son and it was very difficult to motivate him and to direct him toward agriculture. However, this family farm has quite a long tradition. My father and my husband's father were also involved in the same activities. So, it is a very important question. It should be the focus of our attention for the future. It is not simple. It is a very complex issue to address the young people, to make them motivated and, at the same time, to make them familiar with the challenges that modern agriculture faces.

There are different factors involved – we can see this now in this conference; productivity, sustainability, environmental concerns, health concerns and so on. So, somehow we have to find answers to these elements one by one and integrate the future generation, to direct them to this very important sector. Agriculture is our future. What I wanted to say during the panel is that production

is a very important factor but it is not everything. If we think in a short-term view, we can say that productivity must be an important element and everybody says that productivity is very important – we should feed the world, we somehow have to tackle hunger and so on. Yes, that is true. But I think that when we want to address this question we should see what else there is behind it. So, productivity is just one concern. But, at the same time, what effects will this productivity have on our future? It is another important concern.

### **Papa Abdoulaye Seck, Senegal**

First of all, you have spoken of seven universities but we do not know if there are any African universities on the list. So I do not know who I should ultimately address, but I can say that in terms of young people, we are increasingly in favour of young Africans committing themselves to high-level scientific and technical research. Why? Because we need these young people to become part of the knowledge generation, which will effectively enable African agriculture to change positively and sustainably. Yes! Science is universal but still we must always remember that it is the field that should control the process and that those who are effectively at the field level are better placed to provide results that are both practical and workable. So what we need is a critical mass of researchers and we are counting on young Africans so that, over time, we can call on biotechnology, and in this union of “giving and receiving” of knowledge, we can come to give and to receive, instead of just simply receiving.

The second message that I would like to deliver is that of encouraging young people to take up farming, especially well-trained young people because they will be able to use their knowledge and expertise to contribute to this continent, to Africa, so that there is adequate agricultural supply in terms of quantity, quality and income for producers, and so that we can resolutely progress towards sustainable food and nutrition security. Consequently, the accumulation of knowledge as well as investment in agriculture will help convert farming into a business, a trade that can be undertaken, to earn a good living and have a respectable social standing at the heart of our society.

These are the two messages that I wanted to transmit.

### **Néstor Roulet, Argentina**

I will begin with a life story. I live in the inland province of Cordoba in Argentina, in a small village of 8 000 inhabitants located in the middle of the country, where we had first-hand experience of immigration to the cities. At one stage we thought that agricultural production in Argentina had no future, production was not possible, because of problems related to climate. However, the reality is that now many young people are returning to the countryside, and these young people are returning because we offered them a framework of innovation and technology.

I have seven sons, and today I can say with pride that two of my sons are working with me, something that fills me with emotion, and all of this is thanks to innovation and technology, because we realized that the agriculture sector was not making a profit. We can live at ease in the countryside, whereas before we could not. This is why I would like to tell young people that biotechnology is just one more tool. It is one more tool among the many other possibilities available to us. In our case it was direct seeding, and now we use precision seeding, using a satellite-based green index and, in areas where more fertilizer is required, we put more fertilizer and in those areas where less is required we use less.



And this is done with young people. That is why I say to young people: embrace this innovation and technology package because we have a great future, come back to the countryside, and live well. The fact is that we are ignored even when sometimes we pay premium rate taxes and yet when things need to happen we are considered second, third or fourth rate citizens. This is why I tell young people: embrace this technology that is beneficial for our future and that also gives us huge opportunities.

I always say that each country has a moral, social and humanitarian obligation to offer the world what it does best. In Argentina, one of the things that we do best is food. This is why we have the moral, social and humanitarian obligation to produce food. And that young person who wants to work, will also want to produce food. This is why I say to young people: let us work in this together, because the world has one of the necessary tools to prevent hunger and it also has a tool to tackle climate change.

### **QUESTION 3. Marcela Villarreal, FAO Moderator**

Earlier in the first session of this high-level segment, we had two different questions. One was about thoughts and recommendations regarding the future of FAO in the area of biotechnologies. The other was about the message that you would like to give to the young students listening today – from seven universities around the world, from all the regions, and also students here today in Rome. Please respond to one of the questions, choosing which one you want.

#### **Begum Matia Chowdhury, Bangladesh**

Dear sweet people of the world. People and civilization, it goes with science. I was thinking of one of the dramas some time back. The drama was of Galileo. The debate was whether the sun moves or the earth moves. Galileo was executed but the reality is that the earth moves. So, you cannot deny science and you are to go with science. That is the answer.

#### **Henri Eyebe Ayissi, Cameroon**

I think that we have clearly understood FAO's role and we have addressed it in our presentation. We must propose that FAO really does support this project through its research and above all, as part of Africa, Cameroon, following on from what my colleague from Senegal said, recommends that FAO helps to facilitate regional dialogue in Africa, working to make research results available so that validated results can be used by farmers. This is because we need to use the results from research that is conducted in well-prepared and equipped laboratories. However, I would also like to highlight, along with my Senegalese colleague, that we continue strengthening research in this area.

Regarding the young people, we have already said that agriculture is the most important area for employment. We must encourage well-trained young people to commit to work in farming, especially emphasizing their level of qualification so that family farms can be transformed by the level of knowledge of these young people using what they have learned, and in particular to help exploit new techniques, including both technological and biotechnological inputs for greater yields. In essence, in order to encourage young people into farming, Cameroon's Head of State, the President of the Republic, Paul Biya, recently said in a speech to young people that those who were committed to farming would be able to build their lives and succeed in life. In reality, there are no other alternatives but it is a question of beginning a journey where agriculture that has been modernized by new



technologies producing greater yields will permit these young people to build and fulfil their lives. This is the most appropriate message to give on this issue at this moment in time.

**Gerda Verburg, the Netherlands**

First, let me underscore the importance of a good connection between farmers and research because I agree with all those people that science is crucial. But the link between farmers who have the experience, the wisdom, the generations in their DNA, they know what they want, they know how to work together and they are able to ask the right questions. So, I would like to promote the idea of participatory breeding programmes and I am also very much in favour of promoting access to precision breeding methods.

To young farmers I would say: speak up. Because what we need to do is to encourage young farmers and to create a future for them, both for male and female farmers, which means access to education, which means indeed the affordability and the accessibility to new technologies, linkage to markets, opportunities to make a proper income so they deserve fair prices in order to build their family, send their children to school and have a future in making progress. We should not tell young people to stay on the farm poor, hard-working, dependent and, from time to time, hungry. That is not the message to our youth. So, let us give them the opportunity and support them in making progress and a good income so that we, as consumers, have to pay fair prices as well and there have to be fair prices in the value chain.

**Michael Scuse, the United States of America**

I want to address all those students that are out there that are watching. I think now is probably the most exciting time that our young people can get involved in agriculture. There are so many areas where we need the enthusiasm and the intelligence of our young students that are out there today. And it is not just about biotechnology. We're looking at making advances in organic agriculture, in technical agriculture that need to be done. If you look at the science, the technology, the mechanical technology is changing, the equipment is changing. We're using satellites now, so we're talking about space to use satellites to track our equipment in the field. There are the environmental sciences to look at ways that we can do agriculture in a more environmentally-efficient way. There is a need for engineering students.

Education is not just about producers out on the farm and it is not just about the scientists. But so many of our population now no longer lives in our rural communities. They have moved to the cities and are generations removed from agriculture. There is a need for teachers to have the ability to go into the classrooms and teach our young people, that next generation, about the importance of agriculture. So I think now is probably the most exciting time that our students can get involved in agriculture, because there is so much to do, so many opportunities, so many different fields and I would encourage all of our young people to take a real hard look at agriculture and what it has to offer.